An Exploration Of The Relationship Between Teachers' Pedagogical Stance And The Use Of ICT In Their Classroom Practice

Thesis

An exploration of the relationship between teachers' pedagogical stances and the use of ICT in their classroom practice

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Abstract

This study explores the relationship between teachers' pedagogical stances and their use of ICT in classroom practice. Most previous research about ICT use in schools is quantitative and/or treats technology and teachers as independent of each other. Yet ICT practices do not exist without the individuals who use them and the contexts in which they are used. Very little is currently known about the sociocultural influences that affect teacher's implicit (rather than espoused) views on ICT in teaching practices.

In this study Twining et al's (2017) sociocultural framework has been synthesised with further literature foregrounding influences from Identity and the Self. This offers a new model - the Funnels of Influence - as a means to understand the ways in which individual teacher's pedagogical views come to exist and how they affect the use of ICT within their teaching practices.

This sociocultural study adopted a qualitative, interpretative method of enquiry. Between January 2018 and April 2019, data was generated in two primary schools in England. This consisted of two headteacher interviews, 21 teacher interviews and eight observations of teacher practice. Through the use of case study, three individual teacher's espoused, intended and enacted pedagogical stances were probed, surfacing the many influences and revealing teachers' implicit pedagogical stance. The ways in which those teachers used (or did not use) ICT in their teaching practice were then unpacked by considering relationships between teacher's pedagogical stance and enacted ICT practice.

The study exemplifies how different teachers who appear to be using the same ICT practices and who appear to be pedagogically aligned, can instead be enacting profoundly different practice. There are important implications for policy makers and practitioners who seek consistency within and across schools, and for those who seek to disseminate successful practices. Most importantly, the findings within this study emphasise the importance of researchers and practitioners looking deeply below the surface when considering ICT in teaching practice.

Acknowledgements and Dedication

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- My best friend Jen (1980-2005) who had always wanted to do a PhD – one of the many dreams we both shared. This is for both of us.

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Chapter 1: Introduction

1.1 Professional Context

My interest in unlocking opportunities for children's learning was manifest many years before I decided to become a teacher. My first master's degree focused on music theory and analysis and awakened me to the precise detail within musical structures that can affect the way that we think, feel and act – often without us being aware of it. My thesis for that study explored the impact of different background music when played in the primary classroom. That study unleashed a passion for researching in-situ in order to apply research findings directly to practice, and so began a teaching career – founded upon a desire to research and apply findings in order to improve learning opportunities for children.

In the role of class teacher and then senior leader of an infant school in the South of England, I saw directly what a difference Information and Communications Technologies (ICT) could make to children's learning when adopted strategically. There was a great deal of interest in how we used ICT in our school for extending children's learning opportunities (e.g.Jewitt et al., 2010; Lee and Finger, 2010; DCSF, 2009; FutureLab, 2009), and in 2007 we won the first of a number of awards for ICT in teaching practices (Becta, 2009). The background to such use and the consequent interest was because it foregrounded the way in which ICT made it possible for children to do things that were previously not possible, or which were prohibitively complex for widespread adoption. For example, connecting children aged 4-7 online with family members on active Royal Navy service so that despite thousands of miles separating them, parents could have real-time, learning-focused, regular interaction with their children during the school day (Aubrey-Smith, 2007).

Subsequent professional roles – first as Head of Educational Development for an education technology company, and then as Head of Primary for a national schools network – gave exposure to a wide breadth of stakeholders concerned with ICT in teaching practices. This included children and families, teachers and support staff, leaders and teacher educators, policy makers and industry. All of whom had opinions about ICT; acknowledging in different ways the presence of ICT in our everyday lives and the mismatch with schooling. Furthermore, whilst there seemed to be a general consensus that ICT could be better used within teaching and learning, it was still the preserve of the enthusiastic teacher. I wanted to know what it was about ICT and its relationship to teaching practices that needed to be unlocked so that all children would be able to see the benefits in their learning.

Literature findings suggest that practices and experiences both within and beyond school influence the pedagogical stance of the teacher, and it is that pedagogical stance which

determines what the teacher enacts through the use of ICT in their teaching practice (e.g. Mumtaz, 2000; Underwood, 2009; Ertmer and Ottenbreit Leftwich, 2010; Selwyn, 2011).

There has been a great deal of research concerned with conceptualising the ways in which children's learning experiences are impacted by the presence of ICT in teaching practices (e.g. Burnett, 2016; Gurung and Rutledge, 2014; Higgins et al., 2012; Collins and Halverson, 2010), and related to this, the conceptualisation of changing pedagogies in light of ICT (e.g. Luckin et al., 2012; Twining, 2002). Much attention has consequently been given to the role of system change in realising the perceived improvement possibilities offered by ICT (e.g. Fullan, 2020; Weatherby and Clark-Wilson, 2019; Hennessy et al., 2005). However, as Selwyn (2011) notes, teachers act as pedagogical gatekeepers to or for the children that they teach. Little attention has yet been placed upon the teacher's implicit pedagogical stance (rather than their adopted pedagogies as seen through practice or espousal), and the role that these may play in a teacher's use of ICT.

In seeking to understand the relationship between teacher's pedagogical stance and their uses of ICT in teaching practices there is another pitfall; that what a teacher says is not necessarily the same as what they mean, or implicitly believe (Rogers et al., 2005). Therefore, to ask teachers directly what they consider to be the relationship between their pedagogical stance and ICT is fraught with three difficulties. First, it would require the teacher to be able to identify and articulate their pedagogical stance; something which is not often spoken about (Pajares, 1992). Secondly it would require them to relate that to ICT; which is more often discussed in terms of practice and pedagogies, rather than pedagogical stance (Burnett, 2016; Selwyn, 2018). Third, in order to understand an implicit pedagogical stance it would require the teacher to surface it in a way which was not unduly influenced by their perceived audience; something which sociologists argue as implausible (Tannen et al., 2015). A deeper, more probing study was therefore required.

1.2 Ontology and Epistemology

This study draws upon sociocultural theory, and is framed within a qualitative and deductive interpretivist paradigm which posits that there are multiple realities of any given situation; each of which is socially constructed (Lave and Wenger, 1991). The many phenomena, which we label as people, places, artefacts, experiences, and so on (Shibutani, 1988), combine, and form socially constructed, collective agreements of meaning and representation (Bourdieu, 1984).

There is a specific challenge with a sociocultural research lens; the process of the researcher engaging with both the literature and the data is an act of interpretation in itself by means of the lens through which the researcher views it (Hammersley and Atkinson, 2010). The researcher necessarily interprets that which surrounds them in order to

synthesise concepts and extract meaning, yet in doing so creates findings that may be as unique as the context from which they are drawn. For the purpose of this study, attempts have been made to surface bias throughout the researcher's interpretation of both literature and data. However, the whole study should be considered as being framed within a sociocultural ontology. As Guba and Lincoln (1994) argue, the researcher's ontology affects both research design as well as data interpretation. This is particularly important to surface in relation to ICT in teaching practices because it seeks to counteract the many issues (as discussed in Chapter 2) caused by a prevalence of quantitative studies in the field.

1.3 Research Aim and Questions

This research has one over-arching aim; to explore relationships between teachers' pedagogical stances and ICT use in their teaching practice. This aim takes place through the following research questions; addressing individual teachers.

RQ1: What is the teacher's implicit pedagogical stance?
As surfaced by asking:

- RQ1a: What is their espoused pedagogical stance?
- RQ1b: What is their intended pedagogical stance?
- RQ1c: What is their enacted pedagogical stance?

RQ2: How does the teacher use ICT in their teaching?

- RQ2a: What does observation of the teacher's practice reveal about their uses of ICT?
- RQ2b: What did the teacher say about using ICT in their teaching practice?

RQ3: What are the influences affecting the relationship between the teacher's pedagogical stance (from RQ1) and ICT use in their teaching practice (from RQ2)?

1.4 Defining key terminology

Whilst the definitions of terminology are generally embedded within the body of this thesis, the research questions set out above include some specific terms which reflects the researcher's own stance. For clarity therefore, these are defined and justified below in order to be explicit about their meaning within this study. These are: Teacher and Teaching; Pedagogical Stance; Espoused, Intended and Enacted; ICT and Relationship.

Through a sociocultural lens as used in this study, an attempt to understand the **teacher** not just their **teaching**, depends upon an acceptance that the teacher is an accumulation of that which surrounds them in the present and has travelled with them from the past (Bourdieu and Wacquant, 1992). It is important to note that the research questions in this study are all framed around the individual teacher. When probing teaching practices

(RQ1c and RQ2), the focus is on what it is about that teacher that led them to adopt that kind of teaching, rather than seeking to understand the teaching methods themselves or the wider classroom practice. Hattie & Zierer (2019, p.22), referring to broader ideas across the literature about improving learning, summarised that whilst teaching has been well researched, other areas such as teachers are less well explored. Whilst their frame was broader than ICT, the same principle applies to ICT in teaching practices.

Furthermore, this study uses the term **pedagogical stance** to refer to the individual teacher's views on teachers and teaching, learners and learning, views on knowledge, the purpose of education and the role of schooling. Pedagogical stance is conceived as specific to the teacher, whilst pedagogy is conceived as socially understood methods and approaches which may be utilised within that overarching pedagogical stance. Set out in Section 2.3, this study adapts an existing pedagogical framework to use as a tool to analyse teacher's pedagogical stance and to align them with one of the established models of pedagogy.

Whilst RQ1 asks what a teacher's pedagogical stance is, one of the central themes of this study is that what someone says is not necessarily the same as what they mean, and what they mean is not necessarily the same as what they do in practice (e.g. Tannen et al., 2015; Rogers et al., 2005). To be explicit about each of these the terms espoused, intended, enacted and implicit are used when referring to pedagogical stance.

The term **espoused** is used to refer to the teacher's expressed ideology about teaching, learning, knowledge and the role and purpose of school and education. The views are not tied to specific instances of practice (i.e. they are overarching views), but aspects of practice may be used to exemplify a point that the teacher is seeking to make. The espousal may contain oration that can be taken literally, as well as oration that contains intended meaning through choice of words. Within the data of this study the term espoused is used to refer specifically to what the teacher conveyed to the researcher as part of this study (i.e. bounded by time, location and audience).

The term **intended** is used to refer to what the teacher says that they intend to do in their teaching practice. These intentions can be either specific to an instance of practice (e.g. practical actions within a specific lesson), or broader intentions about their practice (e.g. making resources available to encourage children's independence). The difference between espoused views and broader intentions is that the former is ideological and the latter manifests itself in planned practical action.

The term **enacted** is used to refer to what is observed (by the researcher) when the teacher lives out their practice (e.g. when an observed lesson takes place). Enacted practice always has bounds of time, location and people present which are mutually dependent upon each other within consequent interpretation. For clarity, the separation of

espoused, intended and enacted separates the teacher's perceptions from the teacher's actions which makes visible possibilities about how others may interpret the experience. However, this study does not specifically address how practice is experienced by those other than the teacher and researcher (e.g. children in the class). This is because to do so would require the unpacking of other influences on those children and the affect upon their experiences – features which fall beyond the scale and scope of this study.

The term **implicit** is used to refer to the teacher's inner ideology, which may or may not be consciously known by the individual and which may or may not include intentional actions. This term is a particularly difficult one because whilst RQ1 asks what the teacher's pedagogical stance is, it is problematic to precisely define 'is' if one accepts that there are multiple realities. The intention behind using the term implicit is to recognise that having probed the teacher's espoused, intended and enacted pedagogical stances the researcher draws out an interpretation of what the underpinning pedagogical stance is most likely to be. It can only be an interpretation, but it can be a robustly probed and justified interpretation which considers a number of perspectives and triangulated evidence.

This study uses the term **ICT** to refer to a device, method or system which exists as a result of digital or computerised invention. Across both literature and professional practice, related terms such as educational technologies, digital technologies, learning technologies, IT, tech, online and digital appear and in many cases these are used interchangeably or with imprecise definitions. This study uses ICT throughout, except where either literature or data explicitly used a term along with a clear definition of it; in which case that term is used and explained.

RQ2 asks specifically about uses of ICT, and it is important to clarify that within this study attention is paid not just to what the teachers use or how they use it, but also to what is available to them to use, what is expected of them (to use, and through use) and what they do not use. Thus, the term use describes a sense of deploying ICT, as well as an implied value (or lack of) about that ICT.

Finally, and importantly, the term **relationship** is used within this study to refer to the way in which two things (in this case a teacher's pedagogical stance and their uses of ICT in teaching practice) are connected. Those connections include, but are not limited to, links, associations, causal, cyclical or parallel behaviours, and the joining, consolidating or synthesising of ideas. For clarity, those connections may be positive (i.e. in agreement), or negative (i.e. generating friction).

Finally, research terminology (e.g. approach, method, instrument) throughout this study draws upon definitions set out by Twining, Heller, et al., (2017) in guidance for conducting and reporting qualitative studies specific to ICT.

1.5 Thesis Structure

Building on the context and intentions set out above, Chapter 2 introduces three key areas of literature which contribute to the aim of exploring the relationship between teacher's pedagogical stance and their uses of ICT in teaching practices:

- Considering what is already known about ICT in teaching practices and the importance of robust qualitative probing
- Addressing pedagogical stance and its formations - considering what is already known about pedagogical stances and how they come to be
- Synthesising those findings and drawing upon broader sociological literature in order to outline which influences need to be considered by this study and what the literature suggests is the relationship between those influences.

Chapter 3 consists of two parts: the methodology, and the process of data analysis. In setting out the research approach, use of case study methodology is justified, data generation methods and timeline are set out, and there is an introduction to research participants along with ethical and reflexive considerations. The chapter then details the process of data analysis and how the data generated was used to respond to the research questions.

In Chapter 4, findings from each of the three cases are presented and the interpretations detailed and justified. Each case is methodically probed in response to the research questions before findings are summarised and used to lead into Chapter 5, which discusses findings from across all cases and how these relate to existing literature.

The final chapter of this study draws together final outcomes; outlining the contribution that this study makes to the field of ICT in teaching practices, the limitations of this study, recommendations from this study and implications for professional practice and policy including what should be addressed in future research.

Chapter 2: Literature Review

2.1 Introduction

The purpose of Chapter 2 is to identify what is already known in relation to the research questions of this study, to identify gaps within the existing literature, and to inform the methodology of this study. The literature review is organised into three sections reflecting the three research questions and addressing what is already known about: how teachers use ICT in teaching practices (RQ2), teachers' pedagogical stance (RQ1), and the relationship between pedagogical stance and ICT use (RQ3). The chapter then concludes by setting out a theoretical framework which synthesises findings from the literature in order to inform data generation and analysis.

2.2 Teachers' use of ICT in teaching practices

This part of the literature review addresses how teachers use ICT in their teaching (RQ2), focusing firstly upon the landscape of ICT in schools, secondly the context and changes of ICT use in schools over time, and finally ICT use in teaching practices.

2.2.1 The landscape of ICT in schools and the changing context of its use

Over the last four decades there have been consistent attempts to introduce ICT into schools since the first "Computers in the Curriculum Project" in 1973 (Hammond, 2014). Successive English governments have proactively championed technology through national initiatives, establishing agencies to mediate between policies and schools (e.g. British Educational Communications and Technology Agency (Becta)), multi-million pound funding addressing both infrastructure and training (e.g. New Opportunities Fund; Building Schools for the Future), and professional development schemes for teachers (e.g. Twining, 2002b; Hammond, 2014; Rossi, 2015; BESA, 2020b). In 2005, the Department for Education and Skills published their *Harnessing Technology* strategy, setting out ambitious plans for the future of technology in English schools (DfES, 2005). What followed was an era of investment along with organisations, policies and strategies promoting and enabling technology use in schools (e.g. Becta, 2009; Twining et al., 2006; DfES, 2005). Then, in 2010 amidst a recession, a general election brought a coalition government and an era of austerity with huge cuts to funding. For ICT in schools there were many consequences of these changes, including the closure of Becta - which had previously championed and supported ICT in schools - and widespread pressures on school budgets (Rossi, 2015). Furthermore, changes to ICT as a subject and the shift of focus of those leading that review onto Computer Science, also reframed the role and function of ICT within classrooms (DfE, 2013; Wells, 2014; RSA, 2017). Both policy and budget pressures encouraged an accountability-focused landscape whereby value-for-money became a driving force both in schools and beyond (Rossi, 2015).

In parallel, ICT beyond schools had been evolving at a phenomenal rate and becoming embedded throughout everyday lives. It brought greater automation, increased efficiencies, widespread innovation and changed the pace and nature of human behaviour (Hill, 2003; Carr, 2010; Theocharis et al., 2015; Selwyn et al., 2019). The ease with which non-specialists in different sectors could capture, explore and communicate information encouraged bureaucratic tendencies; statistically based headlines and quantitative measurements that could form the basis of comparison and justification (Hill, 2003).

Over this period, how ICT use in schools was defined also changed. In the 1980s and 1990s the focus had been on discussion and practice of children beginning to use new technologies (Twining, 2002b; Rossi, 2015). In the 2000s this shifted to teachers increasingly becoming the users with high profile initiatives such as the introduction of Interactive Whiteboards (IWBs) and teacher laptops (Twining et al., 2006; Becta, 2008; NFER, 2008). These kinds of initiatives brought with them political pressure to 'do something' with the ICT but provided only vague guidelines about what those actions might be (Luckin et al., 2012). Importantly, there was an absence of explicit direction about how to use ICT in a way that would make a direct impact on the priorities of those using it. Those seeking evidence of impact generally sought subject specific attainment improvements, but evidence was instead typically found to relate to perceptions of engagement with learning rather than curricular attainment (Higgins, 2010). There has also been another shift whereby both teachers and children use ICT increasingly within broader teaching and learning, not just within ICT or Computing lessons. In parallel, research has increasingly explored the many dimensions of how access to learning opportunities can be made more accessible for children through uses of ICT (e.g. FutureLab, 2009; Mitra, 2014; Falloon, 2015; Plowman, 2015; Maher and Twining, 2017; Twining, Browne, et al., 2017). However, the debate about children's use of ICT in school contexts, continues to revolve around teachers as gatekeepers of both the ICT resources themselves as well as the opportunities those resources can present.

2.2.2 Trends within the literature: the what and the how

Literature concerned with the use of ICT in teaching practices is located in one of two areas; summarised as 'the what' and 'the how'. The first body of literature has largely been commissioned by, or linked to, policy, funding or accountability and reported on what ICT was working well in schools, why it was happening and what the impact was (Cox et al., 2003; Higgins, 2003; Condie et al., 2007; Passey, 2009; Underwood, 2009; Jewitt et al., 2010; Ofsted, 2011; Higgins, Xiao and Katsipataki, 2012; Morris, 2012; BESA, 2020a). This literature provided valuable insights to inform policy and practice alongside success stories about the potential of ICT in schools. For example, Higgins, Xiao and Katsipataki

(2012), published a summary of the findings of 48 studies of ICT use in schools - across largely core subject areas - and combined that with a meta-analyses assessing the impact of that use. They found the range of impact to be very wide, suggesting the importance of considering differences between how technologies are used. Such quantitative studies sit alongside qualitative companions. For example, Jewitt et al. (2010), sought to identify successful examples of ICT use. They presented this through 12 case studies and a set of 11 benefits arising from those cases, concluding with a set of seven recommendations for what schools needed to do to ensure effective ICT practice. Studies such as these seek to contribute to a 'what works' approach where practice is considered transferrable between schools or teachers.

The second body of research is dedicated to unpicking the relationship between ICT and pedagogy; going beyond the 'what' to probe the 'how'. There are two trends within this body; the first describes or explores the ways in which ICT could be better used to improve learning (e.g. Twining, Browne, et al., 2017; Mitra, 2015; Luckin et al., 2012; Facer, 2011; Selwyn et al., 2010). For example, Luckin et al. (2012), reviewed 300 teacher examples of ICT practices and 1,022 research papers from around the world which claimed proof of impact on learning through uses of ICT in teaching practices. They identified 210 cases which they categorised according to the nature of the learning activity and its impact: Learning from experts; Learning with others; Learning through making; Learning through exploring; Learning through inquiry; Learning through practising; Learning from assessment; and Learning in and across settings. The shift in focus moving from the ICT to the context of the use of ICT has become a feature of this body of literature. For example, Hammond (2020), makes a powerful case for the use of an ecological approach to uses of ICT by arguing that it is the lack of consideration of context which is the cause of the failure within the literature to explain why ICT take-up has been disappointing in some contexts, and yet has taken off in others.

In terms of literature targeting a school audience, the Education Endowment Foundation (EEF) published a report synthesising existing literature about using digital technologies to improve learning, which stated a key finding that; "technology must be used in a way that is informed by effective pedagogy" (Stringer et al., 2019, p.3). This has been argued across academia and industry for some time (e.g. Luckin, 2018; Twining, et al., 2017; Selwyn, 2016) and the authors of the EEF paper themselves cite a similar paper published 7 years previously which contained an extensive literature review of this field and made broadly the same point; "it is therefore the pedagogy of use of technology which is important: the how rather than the what" (Higgins et al., 2012, p.11). One might therefore ask why the debate remains the same in 2020 as in 2012. It looks likely that this was first a mistaken focus on the infrastructure and equipment (specifically, the what), which then shifted to pedagogy and practice (the how). But critically, even when

appearing to discuss the how, most literature is still actually discussing the what. For example, in the EEF report cited above, guidance states that teachers should; “carefully consider how technology is going to improve teaching and learning before introducing it” (Stringer et al., 2019, p.7). But the report continues with a table setting out what quantitative evidence shows as the relative cost and months of additional progress that using particular software will have on children’s learning. By presenting such data in that way there is an inference that it is the relative benefits of the software (the what), that will make the impact on learning rather than the actions of the teacher or learners using it (the how). Although the report does contain reference to the actions of teacher and learners it is at surface level and using ambiguous language. Thus, the focus remains very much on the what despite positioning itself otherwise.

The second trend addresses the nature of teachers’ beliefs about ICT (e.g. Taimalu and Luik, 2019; Tondeur et al., 2017; Ertmer and Ottenbreit Leftwich, 2010; Mumtaz, 2000). For example, Tondeur et al., (2017) undertook a systematic review of qualitative evidence exploring the relationship between teachers’ pedagogical beliefs and technology use in education. There were five synthesised findings. First was that the relationship between pedagogical beliefs and technology use should be seen as bidirectional; with technology use creating, reconstructing or reaffirming beliefs. Second was that teachers’ pedagogical beliefs may hinder or prevent technology integration - teachers with traditional beliefs being less likely to adopt technologies. Third was that a multi-dimensional approach is necessary in addressing the relationship between pedagogical beliefs and technology use; with teachers more likely to adopt technologies that best suit their needs at a particular moment in time. Fourth, that there is very little in the way of understanding of the role of pedagogical beliefs when considering professional development and technologies. Fifth, that some school characteristics made some difference; for example, available support or different policy application for different age groups of learners. The authors specifically noted that not all teachers within the same school held the same pedagogical beliefs and recommended that future research considered this aspect in particular. Furthermore, they noted that very little exists in the way of understanding the bidirectional relationship between teacher’s pedagogical beliefs and technologies. What the review did not consider however were the social or cultural influences on teachers’ previous experiences and how the combination of those influences shapes the lens through which a teacher engages with the world around them – specifically, using ICT in their teaching. Furthermore, the study did not consider the importance of non-use; that what teachers choose not to do can be as revealing as what they choose to do, and that the many influences apply to both.

Such literature about ICT practices within schools surface important findings, particularly concerned with affordances, expectations, norms and routines that a particular school

context places upon the teacher. For example, addressing the role of the school ethos on teachers' uses of ICT, González-Sanmamed et al. (2017) found that teachers held mainly positive attitudes where school wide attitudes were already perceived as positive. This suggests that a school ethos influences the ways in which teachers perceive ICT - that teachers in schools with a positive ICT ethos become more likely to use ICT in their teaching practices. However, what the study did not address – potentially because of the study's reliance upon self-reporting of espoused views - were how those influences inter-related with each other. In other words, that whilst both a teacher and their school may have positive (or negative) views towards ICT it does not necessarily mean that one causes the other.

The influence of colleagues has also been identified as making an impact on teachers' ICT practices. For example, studies have shown that the greatest influence on a decision to use, or purchase, particular ICT resources are the self-reported benefits seen by trusted colleagues (BESA, 2017). Peer-informed decision making, as a cultural norm, perpetuates community-specific interpretation – it is human nature to seek out and trust the opinion of someone who has similar or aligned interests (Grimmer, 2016). Specific to ICT in teaching practices it does however pose a particular challenge when the conversation takes place in isolation from discussion about specific pedagogical intentions.

In order to address this issue in the UK, the Educate programme was established, which built upon the work of Luckin (2018) and presents itself as "The UK's leading research accelerator programme for education technology" (Educate, 2020). The programme provides a structured assessment framework to aid teacher's decisions about what to buy or implement based on evidence specific to teaching and learning strategies. Nesta (a charitable trust set up to support innovation across science, technology and the arts) has also begun a similar programme supporting schools "to make more effective use of technology and develop more robust evidence about what works" (Nesta, 2020). However, the Nesta programme is initially restricted to process-centric uses of ICT (e.g. timetabling, parental reporting, essay marking and automating formative assessment).

The common thread across the literature is that teachers are consistently provoked to do something in relation to ICT; arguably a natural consequence of policy, investment and/or cultural expectation (Luckin, 2018). Whilst school staff almost unanimously agree that integrating ICT into learning and teaching is necessary (BESA, 2018; EC, 2019), ICT has not yet become embedded and use in the classroom remains variable (EC, 2019). As Hammond (2014, p.192), argued, the largely consistent rationale behind initiatives to promote ICT are an assumption that ICT can have a positive impact on standards, that ICT can provide more vocational relevance in the curriculum, or that ICT can be a catalyst for curriculum reform. One of the central challenges to these ideas he argues, is that they

form a reification among educators through which ICT is invested with objective qualities which are, in reality, socially constructed. In other words, people think it is ICT itself that provokes change, rather than potentially being more about the beliefs of people - individually and collectively - that might be the catalyst (or barrier) to change. There is an ongoing debate about whether living out specific practice in a sustained and focused way might eventually (but doesn't necessarily) reshape beliefs (e.g. Halstead and Taylor, 2000; Kagan, 1992).

2.2.3 Issues with addressing ICT use in teaching practices

Literature concerned with ICT in teaching practices often focuses on perceived barriers (e.g. Jerrim and Sims, 2019; Carver, 2016). However, such literature strengthens Hammond's (2014), argument about those who mistakenly invest ICT with objective qualities rather than recognising them as being socially constructed. For example, Hew and Brush (2007), in their meta-analysis of 48 studies on ICT integration, classified the identified barriers to integration into five main categories: resources, knowledge and skills, institutional attitudes and beliefs, assessments, and culture. In a review of related literature, Carver (2016), found the first two categories to be the most cited barriers - the availability of ICT, and the knowledge and skills about how to use it. This trend continues with large scale studies such as the Teaching and Learning International Survey (TALIS) of over 200 schools across 30 countries, which found device, internet and software access to be the most commonly teacher-cited barriers (Jerrim and Sims, 2019). But, importantly, the focus on infrastructure as a perceived barrier may be largely irrelevant for schools in England (where this study is located). This is because in a study across 13 countries, Light and Pierson (2012), found that once a minimal standard of infrastructure was in place the presence of ICT itself made insignificant difference to frequency and nature of use within teaching. That minimal standard of infrastructure was below what the majority of UK schools have (BESA, 2018). Light and Pierson (2012) found that it was instead decisions made by teachers about the ways in which ICT was used which affected learning. This finding was supported by Gil-Flores et al., (2016) who drew upon large-scale TALIS data (e.g. TALIS, 2015) and found that even in schools with a comprehensive ICT infrastructure, there were often very low levels of ICT use.

In reviewing the literature addressing pedagogical use of digital technology, Twining, Heller, et al. (2017), draw attention to an imbalance within existing literature. They highlight that the majority of studies have been quantitative, and that chosen methods of such studies are often not aligned to the ontology, epistemology and overall research approach of those conducting the study itself. Furthermore, Selwyn (2018), argues that research into ICT and teaching practices has suffered from an over-concentration on large scale surveys or descriptive case studies focused on ICT implementation. It is the over reliance on quantitative data and its limitations that Selwyn argues against; constraining

perspectives and distracting or preventing researchers from focusing on what does happen (as opposed to what could happen). Furthermore, such studies often steer participants in pre-defined directions - distorting the data and giving little opportunity for surfacing or probing detail.

Abernethy (2015), set out the methodological issues with self-reported data generation from a psychology perspective. He cites a number of issues including social desirability bias, errors in memory and introspective abilities of the respondent and observer expectancy. In other words, if teachers are being surveyed about barriers to ICT use they may respond in a way that they think will affect change; i.e. by citing the need for more resources and training they are more likely to receive resources and training. This will be particularly the case for data generated by studies associated with policy or funding bodies (e.g. Condie et al., 2007; NFER, 2008; Jewitt et al., 2010; DfE, 2019). Furthermore, as set out by Hoskin (2012), the nature of response options can steer respondents towards particular ways of thinking. For example, surveys asking teachers about barriers to ICT use which give equipment and internet access as response options are unlikely to provoke introspection about personally generated barriers. The survey is framing the teacher to see the barriers as external to themselves rather than relating to their own beliefs or actions. This may or may not be the intention of the authors.

Literature discussing barriers to ICT use consequently often omits discussion of individual characteristics and influences that create the teacher (e.g. underlying values and beliefs, cultural background, identities brought to the classroom), and instead focus on relatively extrinsic factors such as the teacher's training, knowledge or skills about ICT (e.g. Vanderlinde et al., 2014; Condie et al., 2007; Hennessy et al., 2005). All of these aspects affect the teacher and their identity but the relationships are more complex than the findings from these studies suggest. Ertmer and Ottenbreit Leftwich (2010), highlight this in their argument about how knowledge, confidence, beliefs and culture intersect when using technology. They propose that even when teachers believe that ICT helps them accomplish professional or personal tasks more efficiently, they can be reluctant to incorporate ideas into the classroom because of three reasons; lack of relevant knowledge, low self-efficacy, and their existing beliefs. This view has been supported by wider literature. For example, Taimalu and Luik (2019), argue that self-efficacy and beliefs about the value of using ICT are the most important factors in its adoption; what teachers believe can be achieved with technology, and how they believe that they could do so. These findings align with extensive meta-analyses undertaken by Hattie (2019), which found teacher efficacy to be the greatest influence in education. However, what none of these studies chose to explore (in terms of ICT) is how and why self-efficacy comes to be; where its origins are and how these may or may not have their own relationship with ICT.

Researchers beyond education have considered this specific point in relation to ICT. For example, Orlikowski (2010) examined the bridge between social and material interaction, known as sociomateriality. The premise of sociomateriality separates what users think they do with ICT, what they actually do with ICT, and what the ICT does to their identity and practice. Orlikowski argues that the user's (e.g. a teacher's) perception of these three aspects influences the nature of future use, and that this may be quite different from another person's interpretation of that user's experience (e.g. the learner's). In other words, a teacher's thinking about ICT is not so much about what they are doing, as about what they perceive they are doing.

2.2.4 Changes to teachers' uses of ICT in teaching practices

Literature seeking to document changes to teachers' use of ICT typically focuses on disseminating examples of what the author perceives as good practice (e.g. Jewitt et al., 2010; Lee and Finger, 2010; Facer, 2011; Higgins, Xiao and Katsipataki, 2012; Luckin et al., 2012; Christodoulou, 2020), or frameworks for what the authors see as improvements to practice (e.g. NAACE, 2018; Puentedura, 2013; Passey, 2011; Heppell et al., 2010; Mishra and Koehler, 2006).

There are a number of models which seek to aid the integration of technology into teaching and learning which recognise the role of pedagogy (although not necessarily pedagogical beliefs). Many of these have been commissioned or created by the providers of ICT products and aligned specifically with the embedding of those products, which may bias the intentions within them (Apple, 2020; Google, 2020; Microsoft, 2020). Of those concerned with broader ICT integration, the two most recognised and adopted by schools are TPACK (Technological, Pedagogical and Content Knowledge), and SAMR (Substitution, Augmentation, Modification, Redefinition).

The Technological Pedagogical and Content Knowledge (TPACK) framework, created by Mishra and Koehler (2006), proposed three overlapping types of knowledge that teachers need to draw upon in order to adopt ICT purposefully: Technology, Pedagogy, and Content. The model has a number of strengths in terms of prompting teachers to consider the different aspects of knowledge required to use ICT purposefully within a classroom context, but from a sociocultural perspective is problematic because of the way it positions each consideration as separable from others (Kompa, 2018), the ways in which it exists irrespective of the actors within any given school arena, and that it is predominantly focused upon content (rather than process) as an artefact of learning (Voogt et al., 2013).

The Substitution, Augmentation, Modification and Redefinition (SAMR) framework, created by Puentedura (2010), proposes hierarchical levels of use of technology that teachers should aspire to work through, beginning with Substitution, then Augmentation, Modification and finally Redefinition (hence SAMR). This framework is widely adopted and

cited by those who find appeal in its scaffolded nature (Aldosemani, 2019; Moane, 2019). However, as with TPACK, SAMR's use is problematic in that what one person sees as redefinition might to another person be substitution – the interpretation depends on subjective pedagogical beliefs.

The difficulty with both of these models is that they steer the teacher towards a kind of compliance mindset. With TPACK this is about acquiring relevant pockets of knowledge, and with SAMR this is about using ICT that meets a subjective, non-specific set of criteria. Both focus on pedagogies and practice without addressing potential friction with the underlying values and beliefs of the teacher, or conflicts with the school arena itself. Furthermore, the design of the frameworks suggests a hierarchy which infers underlying assumptions about what 'good' looks like. Such models then appeal to those who align with the inferred ideological pedagogical stance but hold no attraction (or are negatively provocative) for those who do not. This creates a problem for three reasons. First, as Ertmer and Ottenbreit Leftwich (2010), argue, beliefs are formed as a result of many complex and interlinked underlying beliefs and are difficult to change, and second, that teacher beliefs were found to predict subsequent classroom action (Haney et al., 2002). Finally, teachers with more traditional beliefs will implement what TPACK and SAMR set out as more traditional or low-level technology uses, whereas teachers with more constructivist beliefs will implement what the frameworks set out as more student-centred or high-level technology uses (Judson, 2006; Roehrig, Kruse and Kern, 2007; Ertmer and Ottenbreit Leftwich, 2010). Probing this further, Gobbo and Girardi (2001) gathered quantitative and qualitative data from 24 teachers and found that teachers' beliefs played a major role in how they interacted with ICT and their perception of their relationship with it. Furthermore, Tondeur et al. (2017) found those with more traditional pedagogical beliefs do not see the use of technology in teaching as useful. Becker and Riel (1999) found teachers with more constructivist beliefs are often more innovative and better understand the value of using technology. This finding is in alignment with increased recognition in the field concerned with teaching, and beyond specifically ICT, that the beliefs of individual teachers determine the choices made by them during the course of practice (Higgins and Moseley, 2007). There is therefore a friction between the design of frameworks such as TPACK and SAMR, and what is known about the potential for changing teacher beliefs and practices for those with different views.

There is another aspect to consider. The argument that clear intentions lead to precise actions is well established across education and further afield (Fullan, 2020). In terms of ICT in teaching practices this becomes important because it suggests a loop system, or cyclical relationship between ICT practices and the accumulation of Capital (Bourdieu, 1986). In other words, the more a teacher experiences ICT, the more it influences their thinking about ICT. Some models for ICT use in teaching practices encourage this based

upon the assumption that familiarity with ICT prompts dialogue about its use and therefore becomes a catalyst for both adoption and more sophisticated uses (e.g. Mishra and Koehler, 2006; Heppell et al., 2010; Puentedura, 2013; NAACE, 2018). There are those who argue that using ICT in particular ways can open a teacher's eyes to new ideas and act as a form of 'Trojan mouse' to encourage ICT into practices (Davitt, 2005, p.21; Twining, 2008, p.572), and there have been others who have argued that as the pervasiveness of ICT affects our behavioural psychology it triggers our thinking to consider ideas in different ways (e.g. Nykvist and Mukherjee, 2016; Bria et al., 2015; Castells, 2015; Carr, 2010; Orlikowski and Scott, 2008; Rowlands et al., 2008; John et al., 2004; Riva and Galimberti, 2001). Others argue that living out specific practice can eventually (but doesn't necessarily) reshape beliefs (e.g. Hawkes, 2010; Halstead and Taylor, 2000). However, it depends on the way in which the teacher interprets and enacts the practice. Hargreaves and Fullan (2012), explain that identification motivates people much more than information or abstract visions; in other words, if a teacher sees an alignment between themselves and the practice they are adopting (e.g. shared values) then they are much more likely to replicate it. It is possible therefore that some frameworks or models which seek to encourage teachers to change their uses of ICT in teaching practices might inadvertently be simply strengthening teacher's views (whether positive or negative) about their existing beliefs and practices.

The ways in which the teacher experience ICT matters – even if the teacher is the one instigating its use. Fullan (2020), sets out that if a teacher is clear about what they want to achieve and why, then their actions will be precise and deliberate. As a consequence, they are more likely to achieve what they want to achieve (Askew, et al., 1997). But, as discussed above, even well-established frameworks for teachers using ICT in teaching do not focus on what the teacher wants to achieve, but instead on what the author infers the teacher should work towards. All of these assume that the teacher either wants or needs to change, and that in itself is value-laden relative to an underlying pedagogical stance.

2.2.5 Summary

Section 2.2 sought to draw out literature concerned with how a teacher uses ICT in their teaching and what this might reveal (RQ2). It set out the landscape of ICT in schools and how that has affected teachers, changes to the contexts of ICT use, and then trends and issues across the literature. The key theme emerging has been the importance of understanding the specific individual context that ICT practices take place within, and more precisely, the beliefs and pedagogical stance of the teacher.

2.3 Teachers' pedagogical stance

This part of the literature review builds upon Section 2.2 by setting out what is meant by a teacher's pedagogical stance, how it can be described, and the influences affecting its formation – addressing RQ1.

Use of the term pedagogy has evolved to refer to approaches towards teaching and teaching methods – going broader than individual teachers and including organisational matters such as how schooling is structured and organised (Alexander, 2008; Murphy, 2008). Pedagogy connects teaching with culture, structure and mechanisms of social control (Alexander, 2008), and thus the internalisation of that – a teacher's pedagogical stance – differs from person to person; drawing on shared theories but interpreting those theories individually (Bourdieu, 1986; Hattie, 2004).

This study seeks to explore the relationship between a teacher's pedagogical stance and the uses of ICT in their teaching practices. In order to do so it is necessary to describe a teacher's pedagogical stance.

2.3.1 A framework to describe teachers' pedagogical stances

Cruickshank (2012), argued that seeking descriptions must not become a distraction from the focus of a study itself. Thus, Murphy's "Innovative Pedagogy Framework" (IPF) (Twining et al., 2017) has been incorporated into this study as it provides a tool for describing a teacher's pedagogical stance. The purpose of incorporating the IPF is to inform the process of identifying which model of pedagogy a teacher most aligns with, and the IPF provides a structured way of doing so.

The IPF drew upon previous work about a changing understanding of what is meant by pedagogy and pedagogical models (Murphy, 2008). It defines theoretically informed models of pedagogy in terms of their key features. Each model of pedagogy is presented in two ways. First, key features of each model of pedagogy are described through a series of descriptors grouped under four headings: Purpose of schooling/educational goals; View of teachers and teaching; View of learner and learning; View of knowledge. This means that when considering a particular aspect of pedagogy, it is possible to directly compare how different models view that aspect as seen in Table 2.1.

Table 2.1: Extract illustrating comparisons across models of pedagogy from the Innovative Pedagogy Framework (Twining, Browne, *et al.*, 2017)

Traditional	**Constructivist**			**Innovative**
(Behaviourism / Information Processing)	**Cognitivist / Piagetian**	**Radical**	**Social**	**Sociocultural**
Motivation is extrinsic, learners react to the environment	**Motivation** is intrinsic as learners seek to understand and make sense of the world and resolve cognitive conflicts. Learners are self-directed and self-regulating	**Motivation** is intrinsic but it is to understand how others in society have constructed ways of seeing and understanding the world that provide the learner with power to be self-determined, make informed and socially aware decisions and be socially responsible – a literate citizen		**Motivation** is intrinsic to engage with, and achieve stand-alone competence in socially valued activities and to belong to particular communities

Second, the IPF also enables the researcher to look holistically across a particular model of pedagogy. For example, considering how Socioculturalism can appear through a teacher's views about the purpose of schooling/educational goals; teachers and teaching; the learner and learning and of knowledge. This is important because isolated aspects of practice can often be interpreted as potentially aligning with more than one model of pedagogy, and it is the holistic view that provides the robustness and credibility. The IPF provides nuanced distinctions between different pedagogical models. For example, distinguishing between three variants of constructivism. For this study, the researcher is seeking to infer a teacher's implicit view of pedagogy through an accumulation of their espoused, intended and enacted pedagogy (RQ1). Focusing on distinguishing between nuanced variants within those models is impractical. Accordingly, a simplified version of the IPF (shown in Table 2.2) will be used in answering RQ1 (and its sub-questions).

Table 2.2: The Pedagogical Framework, based on the Innovative Pedagogy Framework (Twining, Browne, et al., 2017)

	Behaviourist (incorporating Information Processing and Traditional forms)	**Constructivist** (incorporating Cognitivist, Piagetian, Social and Radical forms)	**Sociocultural**
Purpose of **schooling / educational goals**	Forming habits, or rules and procedure and associations between them.	Organised, abstract mental models and procedures for applying them, that can be transferred across situations.	Becoming competent in productive and valued social practices. Competence relies developing the shared repertoire of communities (concepts, terms, tools including symbols, procedures, routines, stories and ways of doing things) and understanding their joint enterprise and how to deploy tools to achieve these.
View of **learner and learning**	Learners are receivers and processors of information and passive in the learning process.	Learners are active constructors of knowledge.	Learners are agentive, but agency is distributed across people and tools both physical and psychological. Learning is mediated by the tools available that enable learners to take particular actions.
	Learners are viewed as lacking knowledge and with limited processing (problem-solving) abilities.	Learners are knowledgeable, and that their prior knowledge either determines future learning, or it is only prior subject knowledge which is valued.	A dynamic affordance is what becomes possible when knowledge is used as a tool in interaction with the social and physical world.
	Innate ability determines potential for learning.	Learners may be seen as limited by their age and stage of development, or all learners may be seen as able to theorise (with no age restrictions). Learners may have the potential to achieve more than they can currently do with support of more expert others.	Agency is relational; learning relies on productive relationships with others – it is collaborative.
		Inequality in knowledge during social interaction is key to learning.	Learners belong to different communities and have multiple identities and associated competences within those communities in which they participate. Learners' histories of participation are diverse and mediate their learning in school.
	Motivation is extrinsic with competition with learners reacting to their environment; pace and competition are used to motivate learners.	Motivation is intrinsic as learners seek to understand and make sense of the world and resolve cognitive conflicts. Or, it may be to understand how others in society have constructed ways of seeing and understanding the world, providing the learner with power to be self-determined, make informed and socially aware decisions and be socially responsible – a literate citizen.	Motivation is intrinsic to engage with, and achieve stand-alone competence in, socially valued activities and to belong to particular communities.

	Learning is by imitation or acquisition.	Learning may be a process of mutual adaptation and internalisation, and self-organisation of knowledge to better fit reality. Or, learning may occur in dialogue with others in activity. It is through dialogue that meanings emerge between people. Dialogue relies on collaboration between learners and learners and teachers actively establish joint contingency.	Learning occurs in participation with others as children move through understanding as their competence evolves. Learning is not towards outcomes, it is ongoing and evolving. Participation relies on mutuality, the ability to negotiate meanings which emerge between people and are social through and through.
	Learning is an individual activity.	Dialogue relies on either reciprocity - equality in knowledge and power between learners where meaning making remains an individual activity. Or, through collaboration between learners where teachers establish joint contingency.	Accountability to the shared endeavour is a responsibility of all participants, children and teachers. Learning is an appropriation of shared social understanding. What is appropriated depends on what is made available and for whom. Learning is a transformation of identity and a process of belonging to the communities where the practices are situated and becoming part of that community as competence evolves.
View of **teachers and teaching**	Teachers are the holders of knowledge – the authority.	Teachers are the authority in scaffolding learning to achieve established knowledge claims. – which may be through activity - towards an understanding of established knowledge claims.	Teachers construct learning opportunities from the perspective of the learner not the subject.
	Teaching is by drill and practice, or by stepwise processing of pre-defined information or problems to be solved in the head.	Learning may occur in activity. Younger children may need concrete experiences whilst older children may begin to abstract and create models grounded in practical problem-solving activity. Or, Learners and teachers may both have responsibility for the reflexive co-creation of the classroom subject culture, the ground rules and ways of acting and problem solving. Both may be reflexively agentive.	Teachers connect classroom activities to mature practices in the world, so children can bridge their understanding by recognising potential affordances between school activities and the lived world, and vice versa. Teachers enable children to experience mutuality and recognise the role of identity and what children bring into the classroom from their histories of participation in multiple communities.
	Teachers use pace and competition often to maintain motivation.	Teachers may: guide (rather than instruct) learning with children directing their own learning. Or, teacher may elicit prior knowledge and model learners' knowledge through process of testing and retesting. They may provide contingent guidance moving individual learning towards specified curriculum goals.	Teachers practice is shaped by institutional practices and values. Within a setting teachers reify emergent individual and collective meanings for all to use and make sense of within the context of the activity. The teacher with learners orchestrates support for different learning trajectories within the shared endeavour of the subject classroom.

		Or, they may actively direct experience through scaffolding and the dialogue between children until they achieve stand-alone competence in conceptual understanding and subject specific problem solving or ways of doing. Teachers may direct learning through the zone of proximal development.	
View of **knowledge**	Knowledge represents how the world really is. The world is given not constructed. Symbols like words and numbers carry meanings which are stable across all learners. Knowledge is independent of context i.e. the situations in which it is acquired and is transferable. Knowledge is explicit and a property of the individual.	Knowledge is constructed it doesn't represent an objective external reality. Knowledge is either seen as viable if it fits an experience or meaning comes into existence between people in dialogue. Knowledge can be seen as abstracted and available for transfer across situations, or emerging in social communities, collectively verified and individually acquired. Knowledge is explicit and a property of the individual.	Knowledge is used in action and knowing is a part of action. Knowledge is a tool of knowing within situated action. Knowledge is possessed by individuals and groups in both explicit and tacit form. Each does different epistemic work. Knowing emerges in action and is part of it. Learner competence is seen as what they 'do' well, not just how much they know.

The Pedagogy Framework (TPF) provides informed definitions of three distinct models of pedagogy and a framework for supporting data analysis in determining which model best describes a teacher's pedagogical stance (RQ1). However, what it does not do – because it is not designed to – is to support an understanding of the many influences which have already shaped that teacher's pedagogical stance, nor the influences which affect a teacher at the moment of practice itself. A model for addressing the influences is introduced later in Section 2.5.

2.3.2 Problems with surfacing pedagogical stance

Asking teachers about their pedagogical stance can create challenges. This is partly because teachers rarely talk about their pedagogical stance (Ertmer, 2005; Tondeur et al., 2017), and as argued by Husu and Tirri (2007), when pedagogy is discussed in school it tends to be treated as 'rules for practice'. This affects what and how teachers espouse and act as they seek to align with those perceived rules (Taber, 2011).

Pedagogical discussion in schools and within school-facing material are often aligned with Constructivism rather than other models of pedagogy (Becker and Riel, 1999; Taber, 2011). For example, school-facing literature intended to prompt teacher dialogue such as the *What makes great pedagogy* report by Husbands and Pearce (2012) states explicitly that "Effective pedagogies involve scaffolding pupil learning" (p.7). Implied preference for constructivism (over Behaviourist or Sociocultural models) can become embedded in materials setting out what good teaching looks like (e.g. OECD, 2009), and consequently affects how teachers frame their own teaching to others (e.g. Becker and Riel, 1999).

Furthermore, school leaders talk of good pedagogy, and our pedagogy - often framed as if teachers adopt views tacitly into their own belief system, rather than simply replicating observable practices in order to align with expectations and accountability measures (e.g. Coe et al., 2020; Husbands and Pearce, 2012). Yet from a sociocultural perspective, pedagogy cannot exist without those who engage with it. As Alexander (2009) argues, by nature of there being many who engage, there are multiple interpretations of what such pedagogies consequently look like in practice. Thus, it is problematic to consider any pedagogy itself in absolute terms. This presents a problem with the terminology across the literature where findings relate to what is valued within pedagogy – acts of practice (e.g. Coe et al., 2014; Ko et al., 2014; Husbands and Pearce, 2012), rather than the values or belief systems from which pedagogy itself is built. This perpetuates a focus on surface-level practices rather than underlying beliefs and values.

This is an issue for a study seeking to describe a teacher's pedagogical stance (RQ1). That is because it has been argued that what we say, what we believe, and what we do, do not always perfectly align nor represent each other (e.g. Cooper and Olson, 1996). As set out by Bloomaert (2005, cited by Darvin and Norton, 2015 p.44), agents (in this case teachers) act within a spectrum of consent and dissent, and what appears to be consent may sometimes be a matter of dominant practice; performing acts without necessarily subscribing to the ideology that informs them. Specifically in education, it has been argued that consciously, we teach what we know, whilst unconsciously, we teach who we are (Hamachek, 1999). A teacher's espoused beliefs (RQ1a) cannot therefore be assumed to represent their implicit beliefs.

Yet as set out in Section 2.2.3 the dependence upon self-reporting - espoused views (whether through interview or survey) - has been a feature of much of the current literature concerned with ICT in teaching practices. Research by Goe, Bell and Little (2008) and Coe et al., (2014) found that espoused views of any kind are heavily influenced by social desirability bias. In a school environment with a high public accountability and social agenda, this becomes particularly problematic (Buchanan, 2015). What a teacher espouses (says) therefore becomes shaped by a number of other factors – including who they are speaking to and in what context, the identity they hold within that moment, the origins of the conversation and their perceived agency in it (Beijaard, Meijer & Verloop, 2004; John, la Velle and Baggott, 2004; Chong & Low, 2009).

Furthermore, as argued by Pajares (1992) and Chen (2016), pedagogical beliefs may compete with other beliefs or external factors and as such enacted practice (RQ1c) may also not be a direct reflection of implicit beliefs. This sets out the importance of recognising that a teacher's pedagogical stance is therefore not a single unified state but made up from what they espouse (RQ1a), what their intentions are (RQ1b) and what they live out in practice (RQ1c). Were this study to be looking at the impact of the teacher's pedagogical stance on their students then it might also address what is experienced by the learner but that falls beyond the scope of this study. Each of these – espoused, intended and enacted pedagogical stances - contain elements of implicit belief but are affected by all kinds of other influences (discussed in Section 2.5) yet the teacher themselves may be unaware of (or in denial about) any variance between them (e.g. Hill, 2003; Lakoff and Johnson, 1999). In order to address the relationship between a teacher's pedagogical stance and their uses of ICT in teaching practices (RQ3) meaningfully, it is the teacher's implicit beliefs that need to be surfaced. These are accessed through, but are not necessarily represented individually by, espoused and intended beliefs (RQ1a and RQ1b), and enacted practices (RQ1c).

Finally, reflecting on methodological issues within the literature across Section 2.3, it should be recognised that much of the literature about teacher's beliefs, values and pedagogical stance stems from teacher educators who often study their own students (e.g. Bien and Selland, 2018; Pantic, 2017; van der Want et al., 2017; Chang-Kredl and Kingsley, 2014; Pillen et al., 2013). This surfaces issues about the students seeking to please their lecturers through their participation, implied consequences of participation, researcher-participant relationship and its many biases, implied correct answers to questions and the longitudinal ramifications of the same person undertaking data generation for a study as then assessing the student's work. The methodology chosen by these researchers also imposes limitations on the findings. For example, use of student essay submissions on written life stories and surveys do not allow for non-etymological analysis, follow up questioning, bias triangulation or an understanding of the context of the

participant – all of which are known to be important for robust analysis and interpretation (Bogdan and Biklen, 2003).

2.3.3 Summary

Section 2.3 has introduced a framework that will be used to describe teacher's pedagogical stance (RQ1). This section has also set out some problems with the surfacing of teacher's pedagogical stance, highlighting that what teachers say (RQ1a), intend (RQ1b) and do (RQ1c) may not necessarily be consistent and related methodological considerations. These differences show the importance of understanding the influences affecting teacher's espoused, intended and enacted pedagogies and practices and a model for unpacking those is introduced in Section 2.4 below.

2.4 The relationship between pedagogical stance and ICT use in teaching practices

There is consensus within the literature that the use of ICT in teaching practices amplifies pedagogical beliefs (Higgins, Xiao and Katsipataki, 2012; Luckin et al., 2012; Maher and Twining, 2016). Section 2.3 set out many studies which found that teachers do not share the same views on pedagogy. Hattie and Hamilton (2020) argued that this also applies to ICT suppliers designing, developing and supporting the implementation of ICT for school use. It is not surprising then that many studies have found wide-ranging differences in ICT uses across curriculum subjects and school phases (e.g. Hennessy et al., 2005; John, 2005; John and La Velle, 2004; Webb and Cox, 2004; Selwyn, 1999). In addition, that teacher's pedagogical identities often align with their chosen subject or area of expertise (e.g. Karaseva et al., 2015; John, 2005) or existing learning dispositions (Perry and Ball, 2004). This makes a difference to teachers' uses of ICT. For example, Kozma and Kozma (2003), examined 174 case studies across 28 countries to explore how ICT might be affecting classroom practices. They found a great deal of variance in pedagogical beliefs across subjects even within schools which purported to have a school-wide agreed approach to pedagogy. Furthermore, a study of 26 teachers by Karaseva et al., (2015) found that different subject teachers had views on ICT use which were far more aligned with each other than with those of staff in other subject areas. Specifically, they shared some views on what effective pedagogy looked like but only within their specific subject domain.

This reflects a common argument, that teaching behaviour is mainly driven by interests which are not necessarily specific to teaching (Selwyn and Kelchtermans, 2019). Furthermore, these can form prior to, during or after teacher training, and can continue throughout a teacher's professional life in response to many other influences (Webster et al., 2012). Thus, a teacher's choice of career, school, subject or phase suggests a pre-existing alignment with their internalised identity (Moore Johnson and Birkeland, 2003). All

of these insights have potential to affect a) a teacher's pedagogical stance (RQ1), b) their relationship with ICT (RQ2) and thus c) the relationship of their pedagogical stance with the use of ICT in their teaching practices (RQ3).

The relationship between teacher's pedagogical stance and their uses of ICT in teaching practices (RQ3) appears therefore not just to be informed by context (which suggests a degree of transferability), but inseparable from it. This aligns with the argument that technology practices do not exist without the individuals who use them and the contexts in which they are used, thus they cannot be studied in isolation from society or from one another (Sterne, 2003, p.385).

Furthermore, that the focus must be the individual, rather than subject, department, phase or school. This aligns with the leading thinkers of this field. Selwyn (2020), makes the case that there is a need for a more theoretical focus on people's relationships with ICT; looking at ICT as part of, and influenced by, society – not wholly within the educational setting. As championed by Costa et al., (2019) and Selwyn and Kelchtermans (2019), those influences include how individual, physical, social and cultural structures interrelate to shape technology practices (see Sections 2.2 and 2.3).

Exploring the relationship between a teacher's pedagogical stance and their uses of ICT in teaching practices (RQ3) demands some kind of conceptualisation about the possible dynamics from and between those influences. Accordingly, this study draws upon the literature above as well as additional literature, to set out a model which will enable the generation of appropriate data for responding to its research aim and questions.

For clarity, it should be noted that Section 2.3.1 introduced The Pedagogical Framework (TPF) to support the describing of teacher's pedagogical stance (i.e. answering RQ1), whereas the following sections (2.4.1 to 2.4.3) introduce a new model (The Funnels of Influence) for surfacing the influences on that stance (which helps to answer RQ3).

2.4.1 Conceptualising influences and relationships between them

In setting out a model which surfaces influences on a teacher's pedagogical stance it is helpful to draw upon previous studies which are ontologically and epistemologically aligned. A study by Twining et al. (2017), used a sociocultural framework that drew on sociocultural theory as set out by Lave (1988). Lave (1988, p.16) argued for distinction between Constitutive Order (principles that structure the social universe), and the Lived World (how we experience that universe). Furthermore, Lave conceived the lived world to exist in two forms. The first being an Arena; the enduring features of a specific context, and the second being a Setting; an interpretation of a particular Arena and the actions of actors operating within it, by a specific individual at a particular moment in time. Twining et al. (2017) go further to propose that the Arena is where Opportunities are surfaced; things made possible by nature of the enduring features of the Arena, and that the indvidual

person then perceives these as Possibilites (or lack thereof), based upon their sense of the Setting. The role of Identity is seen as mediating Opportunities which results in different perceptions of what is available, possible and desirable.

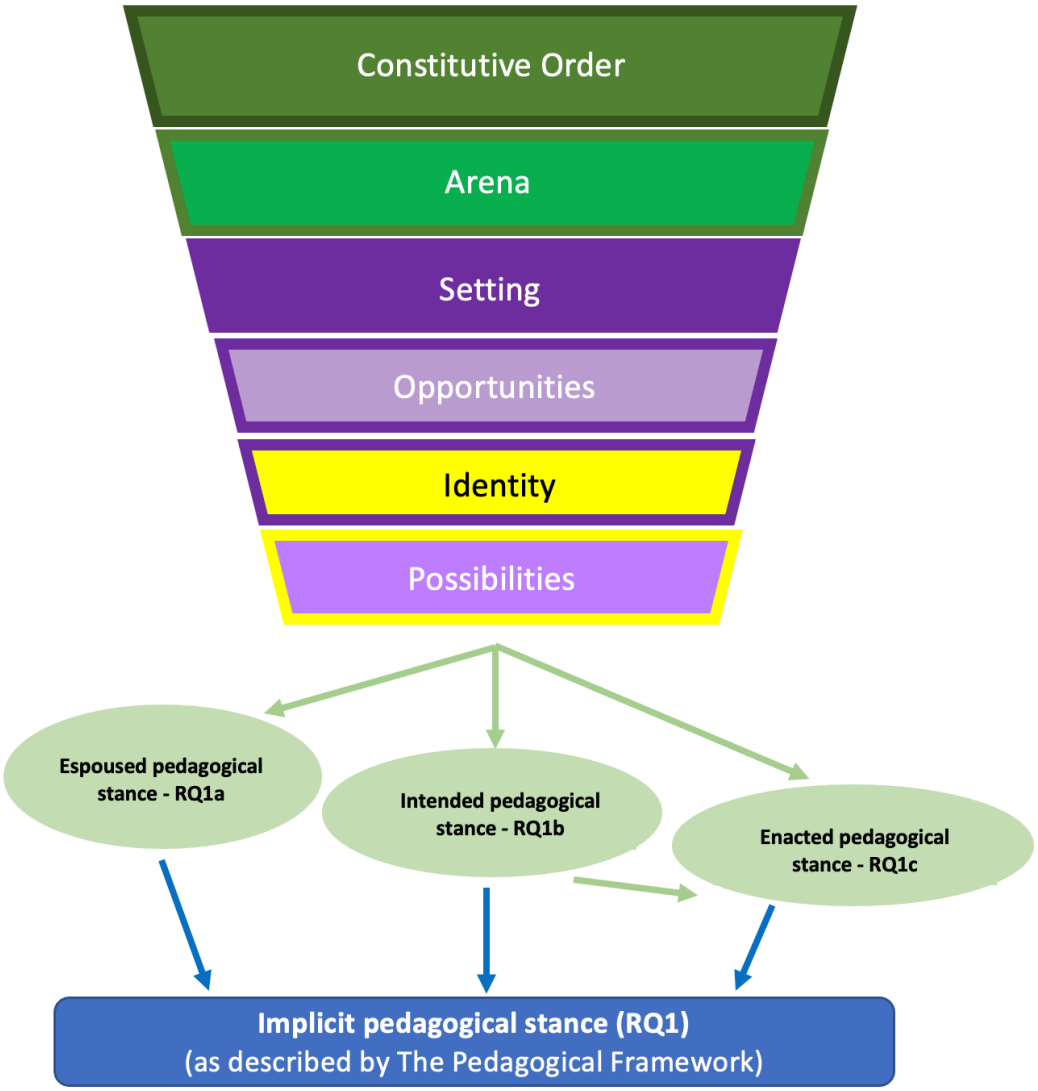
For the purposes of data generation and analysis, Twining, Browne, et al., (2017, p.iii) explicitly surface:

- "The **Constitutive Order** – the broad context within which homes and schools sit, which for example includes national policies; social representations of learning, childhood, and ICT.
- The **Arena** of the school – the enduring features of the school that reflect how the Constitutive Order has been Taken Up in terms of beliefs and values. This would, for example, include norms, routines, rules, facilities, and expectations. The Arena frames the Opportunities that are available.
- The **Setting** (people in action) – the people within the Arena who interact with each other and with the child/children, in the context of the Arena and non-enduring features in the moment. Through their actions people within the Arena create and/or constrain what the child can do. The Setting (People in action) frames the Possibilities that are available.
- What is **Taken Up**, what individuals do within the Setting (people in action), is a reflection of their **Identities** - what they see as being possible for them to do within the wider **Possibilities** offered by the Setting (people in action)."

(Twining, Browne, et al., 2017, p.iii)

An interpreted diagrammatical summary of the NP3 sociocultural framework, specific to the focus of this study on espoused, intended and enacted practices, can be seen in Figure 2.1 The figure should be read from top to bottom and interpreted as a series of funnels through which influences are gradually filtered and interpreted. The three ovals at the bottom indicate three manifestations of the influences – practice which is espoused (RQ1a), intended (RQ1b) or enacted (RQ1c). Each will be formed by shared or distinct differences from within the influences above them and are bounded by both location and a specific moment in time.

Figure 2.1: Summary of the NP3 sociocultural framework and how it informs RQ1



The NP3 sociocultural framework provides a way to unpack what a teacher espouses, intends and enacts in line with the research questions and stance of this study. It addresses the areas set out through Sections 2.2 and 2.3 as important considerations. However, what it does not offer – because it was not designed to do so – is a means to unpack the teacher's identity. As Section 2.3 set out, unpacking teacher identity – using a sociocultural model - is necessary in order to unpack the teacher's pedagogical stance – which can be described by The Pedagogical Framework (Section 2.3.1) and their relationship with ICT (Section 2.2.2). Furthermore, as Twining, et al. (2017), argued, it is the teacher's Identity within a particular Setting which mediates their perceptions of the Opportunities available to them, and it is those perceptions which form what the teacher perceives as Possibilities. Those Possibilities are then what determines what is Taken Up by the teacher; what they live out through espousal (RQ1a), intentions (RQ1b) and enacted practices (RQ1c).

2.4.2 Drawing the Self out of Identity

An identity held at a moment of practice, and the influences which have shaped that identity, define not just what is lived out, but also how and why something is said or done (Beltman and Glass, 2015; Timoštšuk & Ugaste, 2012; Horn et al, 2008). Studies of teacher identity have gathered pace over the past two decades (e.g. Beauchamp & Thomas, 2009; Beijaard, Meijer & Verloop, 2004). Researchers are increasingly making use of social sciences and philosophy to try to further understand the concept, combining the social context of the person with the concept of Self, personal history, social interactions, psychological and cultural factors (e.g. van der Want et al., 2017; Pillen et al., 2013; Beijaard et al., 1999; Cooper and Olson, 1996).

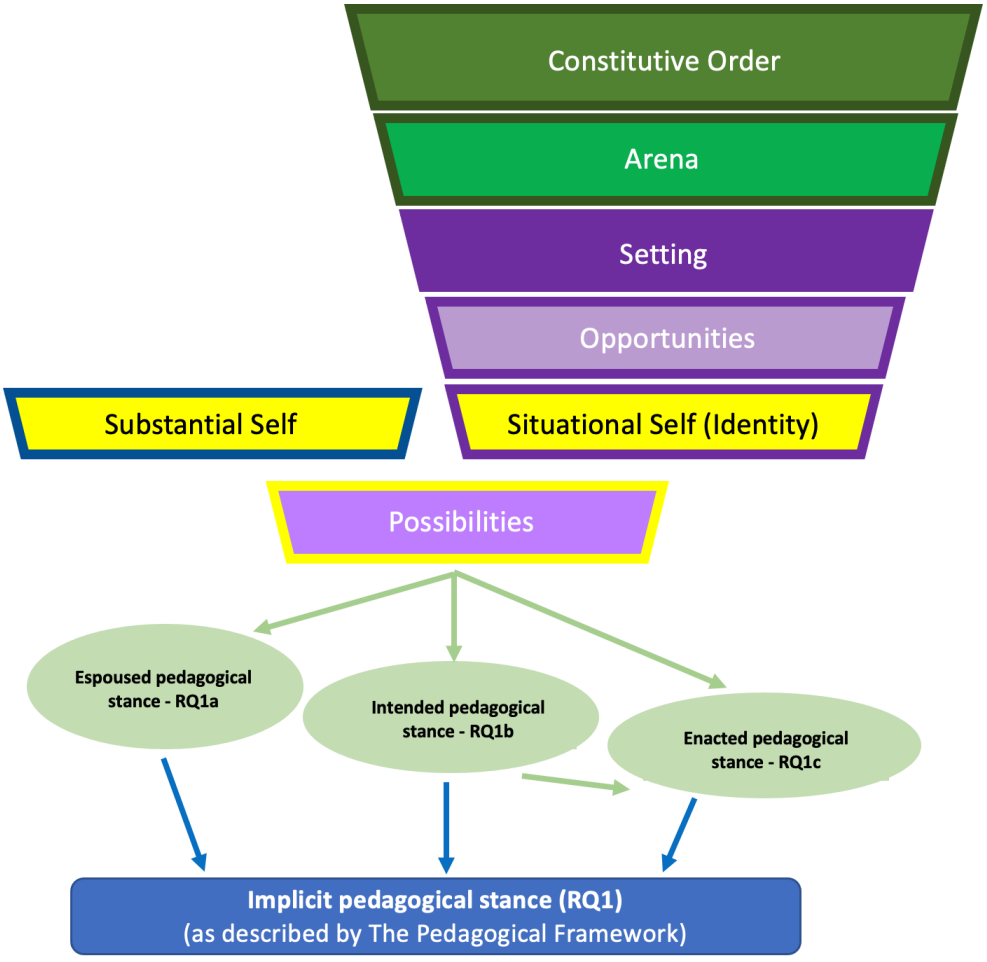
Drawing upon established work about Funds of Knowledge (Moll et al., 1992), Esteban-Guitart and Moll (2014) introduced the concept of 'Funds of Identity'. The 'Funds' of Identity become a Growth of accumulated previous experiences, knowledge and information. These Funds then act as a lens through which a person views and assimilates new information and forms new identities. There are two specific contributors to the Funds of Identity that are important to surface for this study. First, contributions which affect the teacher's pedagogical stance, including their conceptualisation of what it means to be a teacher (as set out in Section 2.3), and second, the importance of influences to their relationship with ICT (as set out in Section 2.2).

As argued by Esteban-Guitart and Moll (2014), an individual teacher's conceptualisation of what it means to be a teacher is an important contributor to Funds of Identity. The teacher's conceptualisation is also a direct reflection of many aspects of their pedagogical stance (Murphy, 2008; Twining, Browne, et al., 2017). As discussed in Section 2.3.1 there are many influences on the formation of a teacher's pedagogical stance which could be conceived as contributors to their Funds and which occur before they even thought about becoming a teacher. For example, that teachers respond to memories of their childhood teachers through either direct replication or counter-reaction (Chang-Kredl and Kingsley, 2014). Furthermore that conceptualising what a teacher is stems from childhood as well as drawing upon adult and professional experiences (e.g. Beijaard, Meijer & Verloop, 2004).

The purpose of probing teacher's identity in this study is to unpack the relationship between the teacher's implicit pedagogical stance and their situational practices. It is therefore particularly helpful to draw upon the work of Rogers and Scott (2008), who argued for a distinction between the Substantial Self as meaning maker (owner) and Situational Self – as manifest through identities - as meaning being made (process). They go further to argue that the Substantial Self is formed primarily at, and even before, birth and in the early years because it emerges from the values shaped by family and

immediate culture. As such the Substantial Self "remains relatively impervious to change" (Rogers and Scott, 2008, p.738). However, Situational Selves – manifest through identities perceived by ourselves and others – are highly contextual, relational, multiple and emotional. As set out by Nias (1993) it is helpful to note that the Substantial Self - which forms in a person's earliest years - determines (but is not the same as) childhood Situational Selves. As such, Situational Selves - lived out through childhood experiences - contribute to a person's Funds of Identity but do not necessarily alter the Substantial Self from which they emerged. The distinction between Substantial Self and Situational Self (manifest through identities) enables greater clarity when looking for specific influences – distinguishing between situational influences and historical influences - making them easier to identify. Figure 2.2 reflects this distinction.

Figure 2.2: Adaptation of the NP3 sociocultural framework to separate Identity into Substantial Self and Situational Self



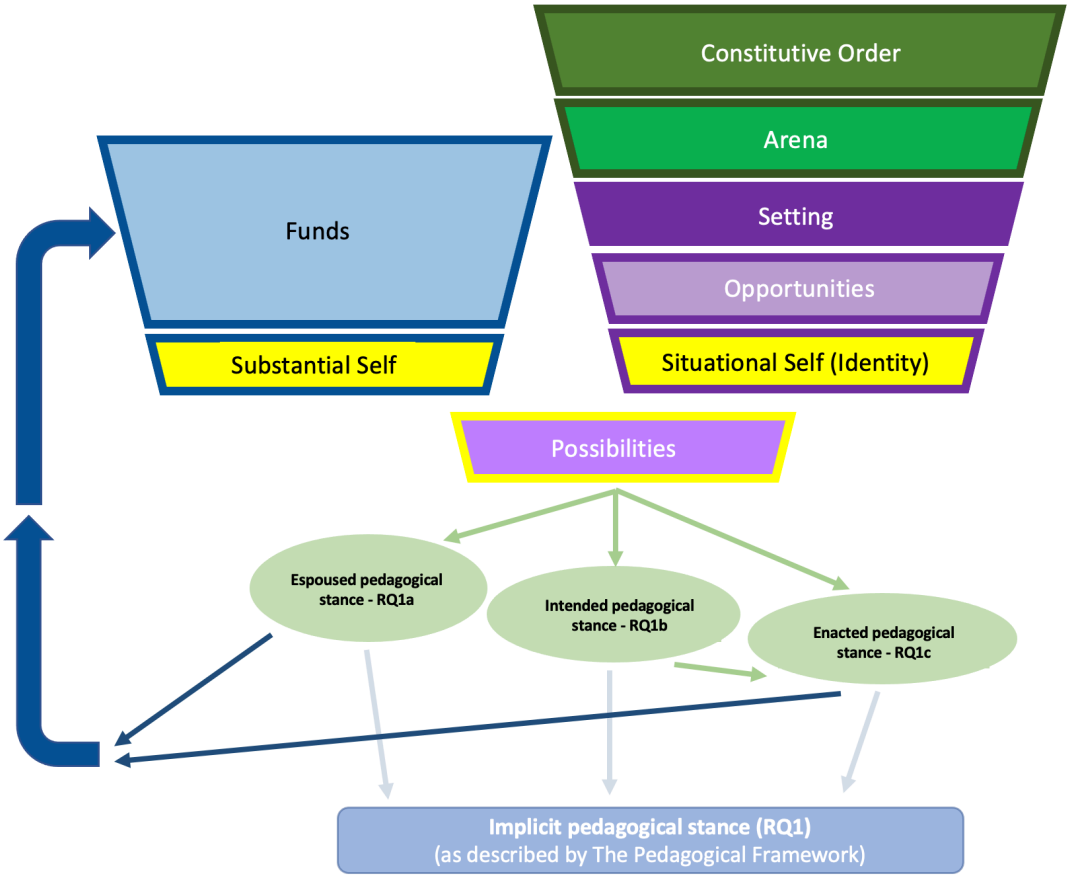
Foregrounding the Self (Substantial Self) as separate from Identity (conceived here as Situational Self), provides additional insight into the formation of teacher's ideological aspirations, pedagogical values and beliefs – matters which the literature highlighted as important influences (Section 2.3). It also surfaces their relationship with social and cultural aspects of ICT (as surfaced in Section 2.2) because their ICT interactions become

relative (to either the Substantial Self, or to the context within which the interaction takes place). As a number of researchers have argued, engagement with a phenomenon reflects a perception of the Opportunities that the phenomenon will (or will not) open up for them beyond those that they could previously access (e.g. Beltman et al., 2015).

Drawing out the formation of Substantial Self requires further consideration of the Funds of Identity. Esteban-Guitart and Moll (2014) position Funds as centering around the concept of the Self (seen in yellow with the blue surround in Figure 2.2). This surfaces consideration of how the building of such Funds can be represented within the sociocultural framework. Polman (2010), drew upon Vygotsky's theory that the development process lags behind the learning process in arguing for a 'Zone of Proximal Identity Development'. He found that identities emerged through 'doing', such that actions taken whilst immersed in a particular context influence the evolution of the identity of the individual undertaking them.

This is an insightful point to synthesise with arguments about the relationship between practice and identity, where two studies argued that practice can be conceived as a contributor to Funds of Identity (see Section 2.4.2 above) through practical action and the cultural or agentive influence within it (Polman, 2010; Esteban-Guitart and Moll, 2014). Literature in Section 2.3 raised this issue and as such it is important to make that link explicit – reflecting that 'doing' (whether espoused or enacted) is in itself a contributor to the fund which shapes the Substantial Self and thus future situational identities. This can be seen through the amendment in Figure 2.3.

Figure 2.3: Adaptation to reflect espoused and enacted practice as affecting Funds



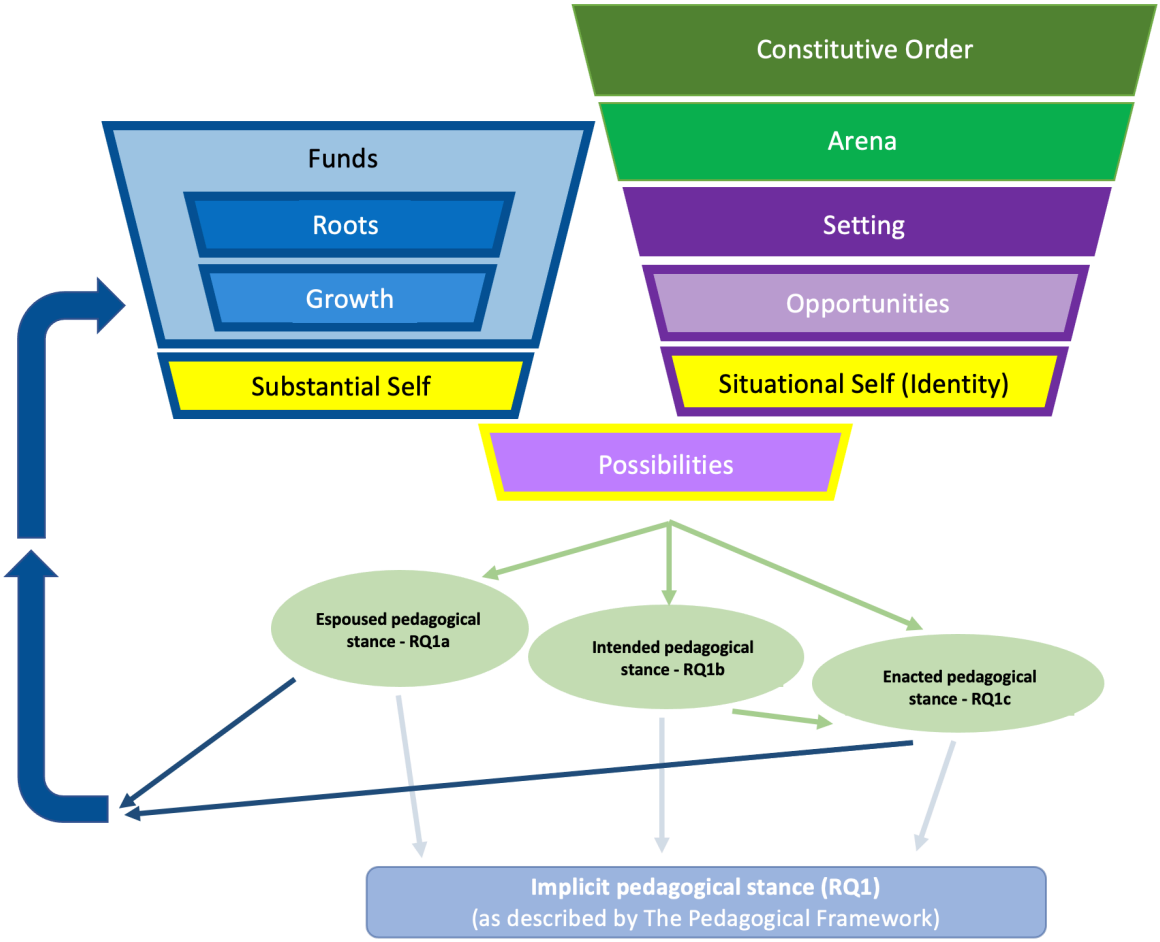
Drawing further on the work of Esteban-Guitart and Moll (2014), the second consideration is about how the Fund itself exists and how to conceptualise this in a way which allows this study to identify influences and thus relationships (RQ3). As drawn out above, the Substantial Self (Self in Figure 2.3) emerges from the values shaped by family and immediate culture in early stages of life (Rogers and Scott, 2008). Going further, Abercrombie (1993) and Nias (1993), surfaced influences by family and immediate culture as shaping the Roots of basic concepts.

As Mead (1934) argued, these influences - from a person's Roots - plant the seeds from which values develop and grow through later reflection and experiences (as manifest through Situational Selves (Identity in Figure 2.3)). Those experiences and the aggregation of their existence were highlighted in Section 2.4 as important influences - thought of as a person's Growth – and are referred to across different sociological models. For example, drawing on Bourdieu's theories of practice, Beckman et al., (2018), undertook a study probing how factors surrounding students affected their relationship with ICT. Whilst the paper focused on students rather than teachers, there are some relevant findings for this study. For example: the suggestion that an individual's socioeconomic status may affect their introduction to ICT; that the source of their initial

introduction to ICT sets out a lens for how it was perceived thereafter; that everyday practices beyond the school affect perceptions and uses of ICT; and that the relationship with notable others (e.g. friends and family) influenced their own relationship with ICT (either replicating those whose opinions they valued, or reacting against those who they did not). It would not be unreasonable to consider that these findings may also apply to teachers.

The separation of the Substantial Self, underpinned by the innermost Roots (drawing on Abercrombie, 1993; Nias, 1993), and then the Growth upon which those Roots build (drawing on Bourdieu, 1977; Mead, 1934), is reflected in Figure 2.4.

Figure 2.4: Adaptation to reflect Roots and Growth as conceptualisations within the Funds



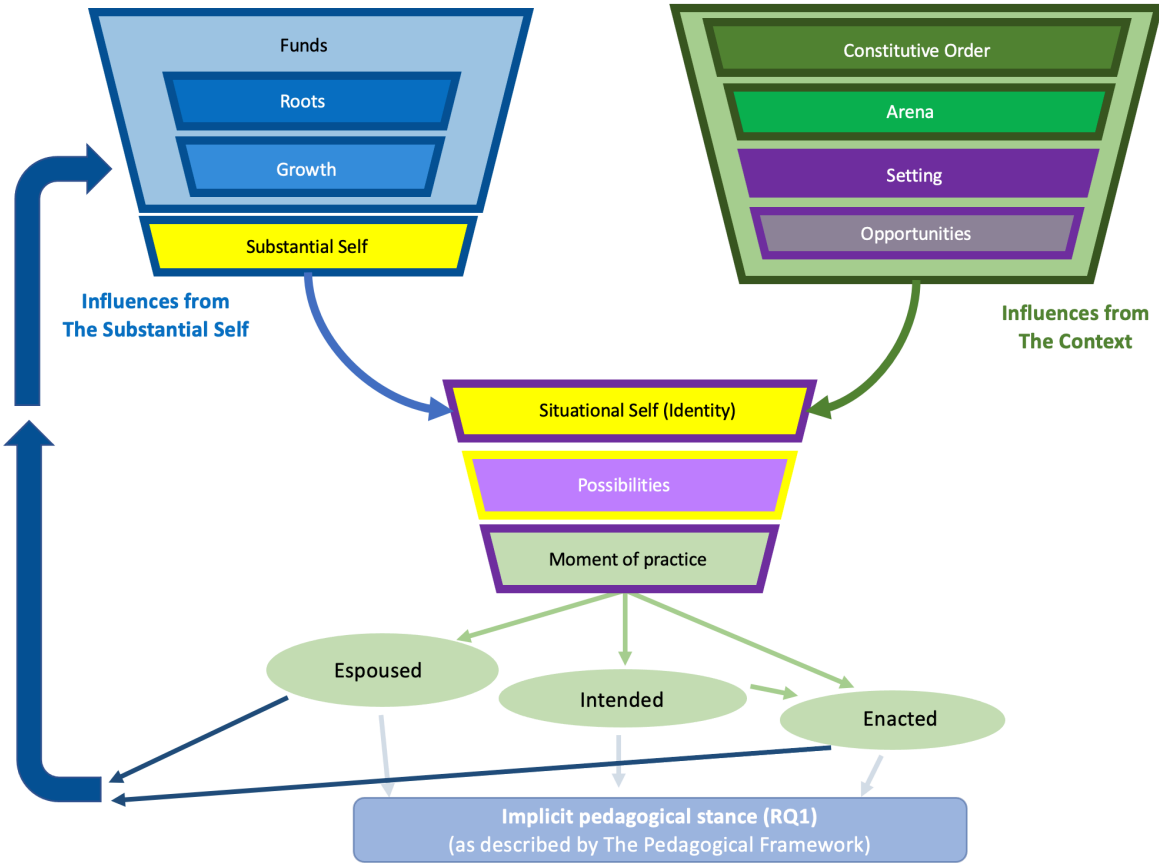
Furthermore, the separation between Roots and Growth brings clarity to the accumulation (Funds) of previous experiences manifest through a moment of practice (as surfaced in Section 2.3), and the contributions of those experiences which is indicated by the thick arrow.

There is one other aspect of Bourdieu's (1977) work which this study draws upon and that is the internalisation of an experience and its effect on identity within the experience itself. This brings an important distinction between the teacher in the Moment of practice, and the teacher taking from the moment of practice – a consideration surfaced in Section 2.3.

Similar in many ways to Schon's (1987) Reflection-in-Action (as affecting immediate behaviours) and Reflection-on-Action (as affecting later behaviours). For the purposes of observing a teacher's practice therefore a distinction is made between something being Taken Up (e.g. a discussion with a specific student at 10:23am), specific Moments of Practice within what is Taken Up (e.g. chosen vocabulary), and the broader but still specific timeframe that sits within (e.g. a lesson from 10-10:45am). The more precise reference to a specific moment of practice is not a common feature across educational literature where observers tend to focus on a longer duration; an activity, discussion or lesson (e.g. González-Sanmamed et al., 2017; EC, 2013; Buabeng-Andoh, 2012; Hennessy et al., 2005). However, drawing on literature from other fields such as medicine, moments are more precisely captured; for example in studies about practitioner internalisation of medical intervention and the consequent impact on practitioner perception and then consideration about what follows (e.g. Hurlburt and Heavey, 2006; Maines, 1993). The benefits to recognising such precision within this study is that it recognises that data, interpretations and consequent adjustments, constantly accumulate. This introduces what critical discourse researchers such as Hodges (2015), call dialogic undertones; meaning which is dependent upon an understanding of what went before *within* the same practice. Figure 2.5 reflects this distinction, by drawing out the Moment of practice from Possibilities. Espoused, Intended and Enacted practices are then seen as manifestations (i.e. not separate features) of that Moment.

For clarity, Figure 2.5 introduces labels indicating the blue funnels on the left as Funnels of influence from the Self, and the Funnels of influence on the right from the Context at the Moment of Practice. This separation enables clearer distinction between what the teacher brings with them to the Moment, and what they inherit from the context beyond themselves in that Moment.

Figure 2.5: Adaptation to reflect the separation of the Moment of practice from Possibilities

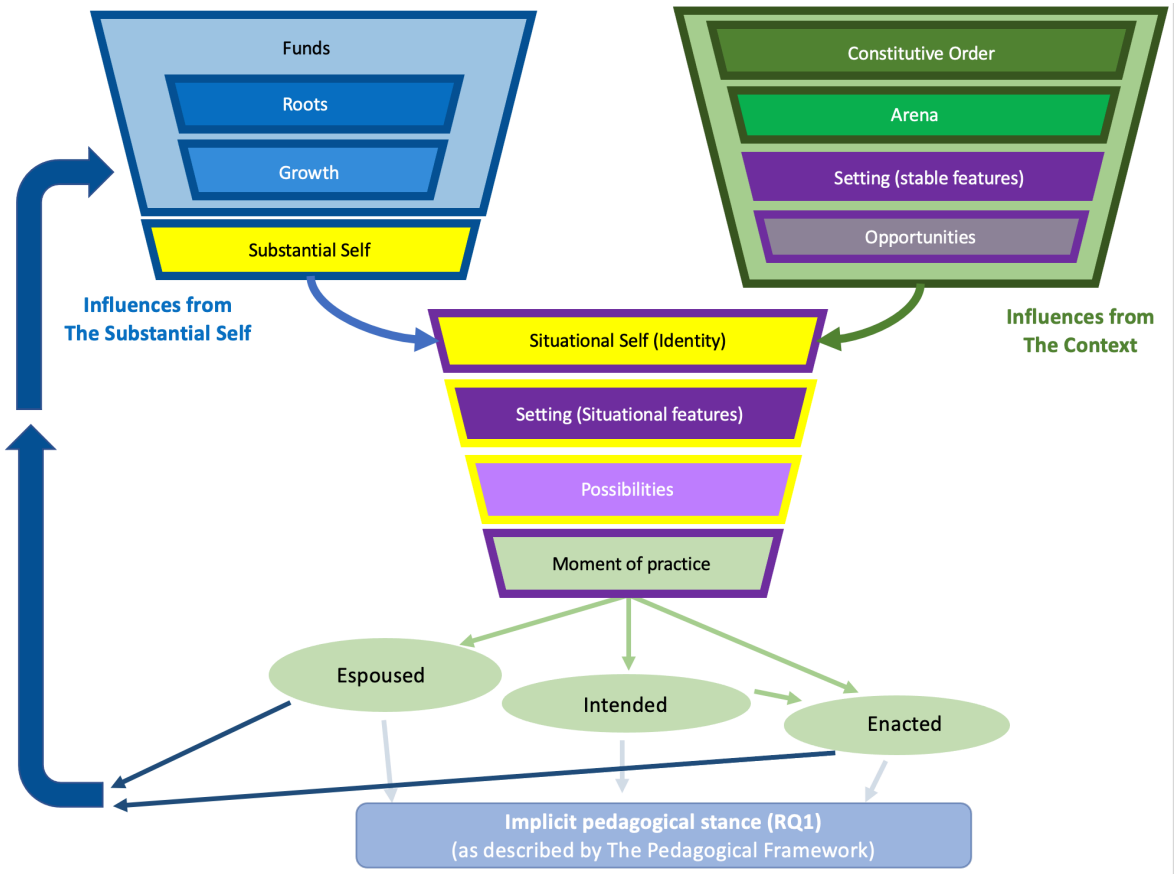


This study sets out that the teacher's school is the Arena and that their classroom (or place of practice) is their Setting. This distinguishes between the enduring features of the Arena (e.g. school policies, expectations, infrastructure), and context specific (to the teacher) but relatively stable features of the Setting (e.g. decisions made by the teacher about the nature of the classroom space such as how to organise the tables). Whilst arguably both the school and classroom are forms of Arena in terms of the stable features, a distinction is needed between them in order to surface where influences are located. Specifically, Arena conceptualises longer term enduring features, whilst this study's definition of Setting conceptualises features which are dependent on the teacher's presence yet are context specific and stable.

However, this interpretation becomes problematic where the influence from the individual teacher is considered separately to the influence from the context because Setting contains both. As Bourdieu (1977) set out, a person becomes a constituent part of a context simply by being present in it – they do not necessarily even need to be physically present (e.g. an absent child is still part of the class and thus informs the teacher's thinking about that class). As such, this conceptualisation of Setting must acknowledge the presence of the teacher in it (as being one of the stable features of the Setting itself), whilst acknowledging that the presence of that teacher is also Situational in terms of how

they then respond within that Setting. This can be clarified by conceptualising Situational features of the Setting (and thus also the Possibilities it offers to the teacher) as being part of the central funnel. This reflects a fusion of influences from the context (which at the Moment of practice is considered stable) and from the individual person operating within that context (which at the Moment of practice will be at least in part dependent on the Situational Self). The Stable features of a Setting (i.e. that which will be consistent for all those within it – such as the presence of an Interactive Whiteboard) creates Opportunities. This distinction can be seen in the final version of the Funnels of Influence model in Figure 2.6 below.

Figure 2.6: Adaptation to reflect separating Setting into stable and situational features



2.4.3 The Funnels of Influence Model

The Funnels of Influence model (Figure 2.6 above) is designed to guide data generation that will help to inform the answer to RQ3. A summary of each conceptualisation within the Funnels of Influence model – defined by the literature throughout the chapter above - can be summarised as:

- Funnel of Influences from the **Context** at the Moment of Practice
  - **Constitutive Order:** Taken from the work of Lave (1988) and Twining, Browne, et al., (2017), this constitutes the Cultural, Political, Global and National Systems and Permeating Beliefs - the overarching influences shaping the landscape that this

Moment of Practice sits within (e.g. government and politics, media, law, economics, industry, national cultural beliefs about the nature of childhood/children family, work, education, social interaction, global disruption of digital technology etc.).

- **Arena:** Drawing on the work of Lave (1988) and Twining, Browne, et al., (2017), this constitutes the enduring (longer term) features of the human and physical space of the many Arena that the teacher moves between (school, home, clubs, shops etc). In this study attention is on the school Arena that the teacher's practice takes place within. Specifically, the enduring features within it (e.g. facilities, routines, expectations).
- **Setting (stable features):** An adjusted interpretation of ideas originally set out by Lave (1988) and Twining, Browne, et al., (2017), the Stable features of a Setting are the specific combination of human and physical features within which practice takes place (e.g. a classroom) and which are not routinely changed. These consist of the children and adults present, the location, available resources etc. The changeable features of a Setting are treated separately (see below).
- **Opportunities (within the Setting):** Taken from the work of Twining, Browne, et al., (2017) this reflects the options available for the teacher to engage with – which could include people (e.g. an available Teaching Assistant), resources (e.g. a trolley of laptops), timetabled capacity (e.g. a one-hour lesson) etc.

- Funnel of Influences from within the **Self** at the Moment of Practice
  - **Roots:** Drawing on the work of Abercrombie (1993) and Nias (1993), the Substantial Self as meaning-maker (unique to the teacher and created through formative years). These influences shaped the lens of the teacher's formative years and influenced their sense of Self and mission (e.g. social ideologies, norms, values and belief systems, culture and sub-culture, and culturally informed elements of Self – age, gender, health etc).
  - **Growth:** Drawing on the work of Esteban-Guitart and Moll (2014), and Polman (2010), the Funds of Identity from previous experiences. The experiences and influences that shaped the teacher's transition from child to this Moment of Practice (e.g. the impact of sequences of experiences within and across personal and cultural influences as well as national policy, rules, facilities, social representations of learning, ICT, significant actors and scripts etc).
- Influences where the two funnels collide
  - **Identity** (Situational Self): Drawing on the work of Beijaard, Verloop and Vermunt, (1999), Korthagen (2004), Olsen (2008), Beauchamp and Thomas (2009), Pillen, Den Brok and Beijaard (2013), Who the teacher consider they are in the moment

of practice, what meaning they conceive that they are making and why the teacher thinks they are doing/saying the things that they do (the consequent choices made as a result of all the above).

- **Setting (Situational features):** Drawing on the work of Twining, Browne, et al., (2017), Consisting of Actors – people; their presence and the multifaceted influence of their presence, and Scripts – non-human factors such as practical resources and digital technology access.
- **Possibilities:** Drawing on the work of Twining, Browne, et al., (2017), this reflects the available options that the teacher perceives as possible to them. This could include how a TA might be deployed or available resources (e.g. a trolley of laptops) as well as perceived expectations (what the teacher thinks is expected of them by the different actors), and what they perceive they can therefore do (Agency).
- As seen through:
  - **Espoused** practice: What the teacher says (RQ1a)
  - **Intended** practice: What the teacher intends to do (RQ1b)
  - **Enacted** practice: What the teacher lives out (RQ1c)

Each of Espoused, Intended and Enacted practices are effectively treated as a symptom or symbol of output from the Funnels of Influence above them and is bounded within a specific moment. For example, not all espoused practice will be consistent; each moment being shaped by different combinations of aforementioned influences.

As a result of this model pivoting around 'The Moment of Practice', as soon as that moment passes, the symbols of practice (Espousal, Intention, Enactment) becomes re-conceived as part of Growth – seen through the upward arrows. This concept works both within practice (e.g. Reflection in Action) as well as consequent to practice (e.g. Reflection on Action), and also will not necessarily be consciously processed.

Arguably the model above could apply to any scenario within teaching practices and not just one concerned with ICT. Furthermore, ICT is not explicitly mentioned within the model itself which may appear contradictory within a study about ICT in teaching practices. However, as outlined in Section 2.3, the enduring problem within research studies concerning ICT in teaching practices has been that it is the ICT itself that is foregrounded – even when studies recognise that there are other influences on teachers' practice. To paraphrase, the emphasis is the difference between:

- How you use the THING (focus is on the ICT)
- How you USE the thing (focus is on how the ICT is used)
- How YOU use the thing (focus is on the person)

Therefore, the location of ICT itself within the Funnels of Influence is that it may be present in any or all of the different influencing areas. As set out in Section 2.2 and 2.4 this includes the role and influence of ICT in global cultural shifts, politics, media, infrastructure, family and social lives to name but a few. The focus is not on the ICT itself, but instead the ICT is viewed as one of many things within that influencing space.

2.5 Summary

Chapter 2 has introduced and synthesised a number of areas of literature which address the aim of exploring the relationship between a teacher's pedagogical stance and their uses of ICT in teaching practices. By first considering what is already known about ICT in teaching practices in Section 2.2, the importance of robust qualitative probing and in particular addressing pedagogical stance and its formations was foregrounded. Section 2.3 set out means to describe teacher's pedagogical stance (i.e. to answer RQ1) through the introduction of The Pedagogy Framework (TPF), and surfaced issues concerned with unpacking pedagogical stance. Section 2.4 then highlighted the importance of considering the many influences affecting both the teacher's pedagogical stance and their uses of ICT in their teaching practices. Synthesising the literature from Sections 2.2 to 2.4 then led to the formation of The Funnels of Influence model (to answer RQ3). Through utilisation of the Funnels of Influence model, this study is able to probe more deeply, and more explicitly, into teacher's pedagogical stance and their uses of ICT in their teaching practices through more directed data generation.

Chapter 3: Methodology

Chapter 2 set out what is already known about the relationship between a teacher's pedagogical stance and ICT use in their teaching practice, alongside surfacing relevant methodological themes. Chapter 3 has two parts. The first part sets out the methodology, including ethical consideration, drawing on existing literature to determine the most appropriate methods. The second part of the chapter sets out the data analysis processes and procedures used and how that analysis was used to respond to the research questions.

3.1 Research Approach

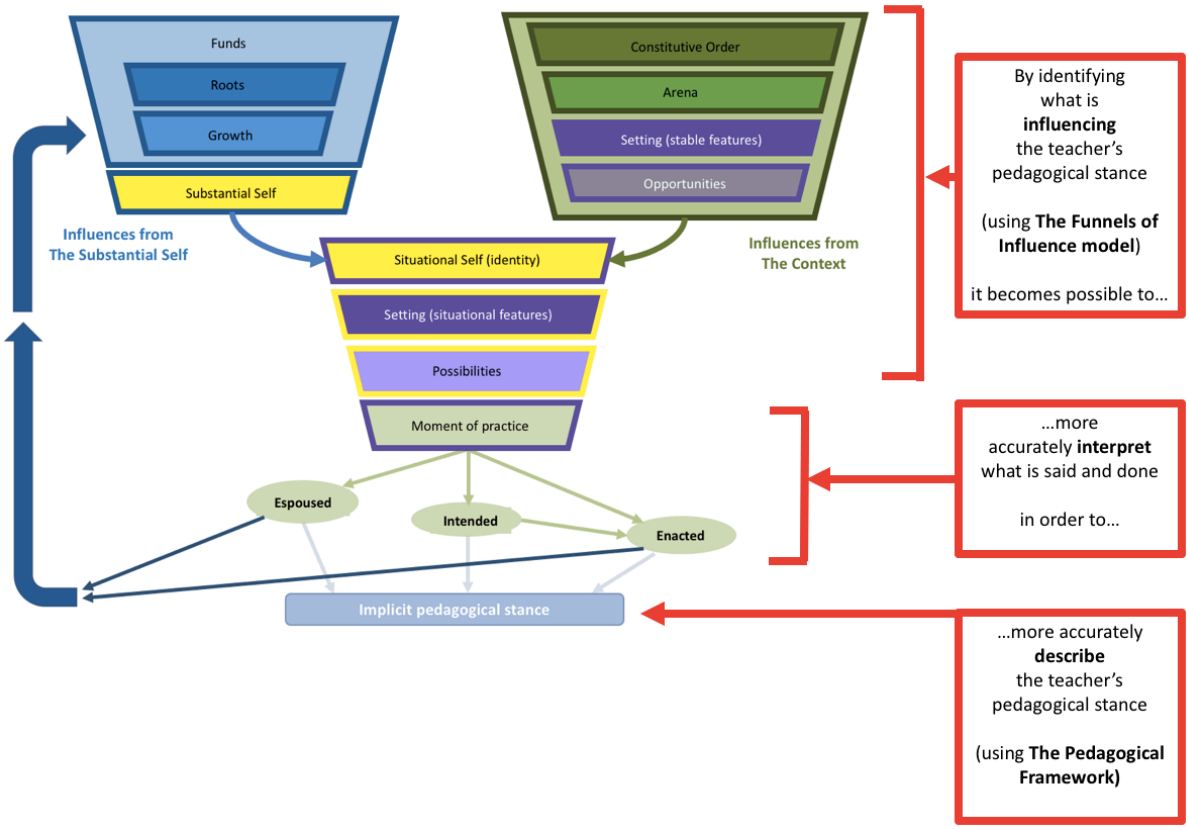
Drawing on the ontology and epistemology outlined in Section 1.2, this study is a form of naturalistic inquiry; seeking to understand the ways in which individuals view, approach and experience the world (Lincoln and Guba, 1985). The role of data generation and analysis within this process is to provide sufficient material to allow the researcher to respond to the research aim (What is the relationship between teachers' pedagogical stance and ICT use in their teaching practice?). A study approached through a sociocultural lens cannot definitively answer any question which uses the word 'is' because it infers a singular interpretation. However, a study can generate data which considers that question from multiple directions. What now follows is a description of how such data generation took place within this study.

As outlined within the literature review, previous research has largely relied upon two approaches. These have included interview and observation where teacher responses and practices have often been interpreted at face value, or, teacher self-reporting through surveys which similarly leaves espoused views unchallenged (Section 2.3.2). Both make assumptions about what the teacher is saying and doing and how that aligns with the teacher's beliefs. As Heitink et al. (2016) concluded in their study of 157 teachers and their professional reasoning about their pedagogical use of technology, only a little over half of teachers showed alignment between their reasoning and their practice. This reflects a common mismatch between teachers reasoning, and what is seen through evidence.

This study takes a different approach which is to probe into what is being said and done; critically considering what is happening as well as why it is happening. As set out in Figure 3.1, the Funnels of Influence model (see Section 2.4) brings a focus to data generation and consequent interpretation by directing attention to what is known to influence teacher's espoused, intended and enacted practices. By identifying and surfacing these influences a more credible and trustworthy interpretation can be extracted both about the teacher's espoused, intended and enacted pedagogical stance (RQ1a-c), and about what the teacher's implicit pedagogical stance is (RQ1). Consequently, a more meaningful

exploration can take place about the relationship between the teacher's implicit pedagogical stance and uses of ICT in their teaching practices (RQ3).

Figure 3.1 Summary of the methodological relationship between the Funnels of Influence model and The Pedagogical Framework



The data generation and analysis of this study achieves this by seeking the teacher's:

- espoused pedagogical stance (RQ1a)
- intended pedagogical stance (RQ1b)
- enacted pedagogical stance (RQ1c)

The response to RQ1a-c is in terms of a mapping exercise against The Pedagogical Framework (Table 2.6). However, as noted in Section 2.4, mapping against The Pedagogical Framework requires taking a holistic view that takes into consideration the context and other influences on the teacher. Thus, the Funnels of Influence model informs that mapping.

Furthermore, in weighing up the responses to RQ1a-c, in order to come to a view about the teacher's implicit pedagogical stance (overarching RQ1), it is important to consider the different influences affecting the teacher. For example, a teacher greeting children at the classroom door can be interpreted as either a socially oriented welcome into a shared space, or a marker of teacher authority as children enter the teacher's territory – with each of those suggesting different pedagogical model alignment. The same action can be interpreted in different ways and thus the interpretation is entirely dependent upon an understanding of the many influences affecting the teacher at that moment in time.

Therefore, the Funnels of Influence Model also informs interpretations about the interplay between the teacher's espoused, intended and enacted practices. That, in turn, enables identification of what the teacher's implicit pedagogical stance is through alignment with the models described by The Pedagogical Framework.

The above contextualises RQ2 which asks how the teacher uses ICT in their teaching, surfaced through:

- observation of the teacher's practice (RQ2a)
- what it reveals about their uses of ICT – the interpretation of which depends upon the findings of RQ1
- what the teacher says about using ICT in their teaching practice (RQ2b) – the interpretation of which also depends upon the findings of RQ1.

This process consequently surfaces the relationship between the teacher's pedagogical stance and ICT use in their teaching practice (RQ3), and importantly, the influences which have affected that relationship.

3.2 Case study as methodology

A study which seeks to draw implicit meaning by probing what a person espouses, intends and enacts could use either phenomenology or case study. Phenomenology is designed to understand subjective, lived experiences and perspectives of participants (Grbich, 2013). It depends upon interview data and participants' own espousals to surface such data (Eddles-Hirsch, 2015). Where a study is considering a specific phenomenon as means of understanding the phenomenon itself, it clearly has an advantage. But where a study requires a range of perspectives in order to understand individual behaviours within that phenomenon then it is not appropriate. In this study, it is the teacher's relationship with their pedagogical stance, not the stance itself (RQ1), and their relationship with ICT in their practices, not the practices themselves (RQ2) that are the focal points. A different methodological approach is therefore required.

As Yin (2018) describes, case study is the preferred method where a researcher intends to understand a real-life phenomenon in depth; where such an understanding is dependent on important contextual conditions as highly pertinent to the phenomenon of study. Within case study, the dynamics between the phenomenon and context are not always clearly evident, and as such multiple sources of evidence, not just interview data, become vital. As set out by Hammersley et al. (2000), there has been substantial debate about the small scale nature of case study being a disadvantage in terms of transferability and generalisation. However, from a sociocultural perspective (the framing of this study), the very notions of transferability and generalisation – whatever the method - are incompatible with a lens which recognises the complex nature of human behaviours (Twining, Heller, et al., 2017). Case studies offer findings that are relatable not

transferrable; offering a deep and 'thick description' (Geertz, 1973, p.310), to stimulate discussion both within and beyond the thesis. For this reason, the cases in this study are not seen as a sample or representative of any wider group.

The other main criticism of case study is that it is not easily open to reader validation, and is vulnerable to researcher bias (Cohen, Manion and Morrison, 2000). Yet this argument assumes that the researcher is separate from the data generated within the case. Through a sociocultural lens the researcher and participants share the space within the case; the presence of each affects the actions of the other and thus the data generated. Therefore, here, case study is conceptualised as the methodology not just a method; explicitly recognising the many influences within the whole dataset. Creating this kind of transparency enables a more robust ethical and reflexive discussion before, during and after data generation.

Hyett et al. (2014) described the many misconceptions surrounding case study in a comprehensive literature review, noting how few case studies provide details of the researcher's relationship with the case, researcher-case interactions and how those influenced the development of the case study itself. Such an omission may reflect the epistemology of such studies; a positivist researcher would see these issues as falling beyond the bounds of the case itself. However, through a sociocultural lens, the researcher's prior experiences will affect what is focused upon during interactions, as well as what is not seen or noticed. In the same way that Section 2.4 surfaced the ways in which a teacher's prior experiences affected their lens on future experiences, so too this applies to the researcher. This affects the nature of the data itself. If the researcher does not notice something (e.g. a contradictory aspect of participant body language) then for the purposes of the research that data does not exist within the dataset. It cannot be interpreted if it is not perceived to be there (Matusov, 2007). To mitigate for the issue this study used audio-visual recordings and reflexive behaviours were surfaced as part of the analysis process. However, despite the application of a critical lens searching for contradictions within the data, this process cannot be flawless. A human still only sees what their prior experiences enable them to see. As further mitigation for this, this study sets out three cases rather than a single case in order to illustrate breadth of data interpretation in different contexts.

3.3 The nature and bounds of the cases in this study

It is important to identify the specific nature and boundaries of the cases. Stake (1995) proposed three types of cases. First, the intrinsic case which is used to understand the particulars of a single case rather than what it represents. Second, the instrumental case which provides insights or is used to refine theory. Third, the collective instrumental case where multiple cases are studied separately as single inquiries, but in unison or parallel to

other cases in order to draw out insights on a shared issue. This study contains collective instrumental cases; where three distinct and separate cases are used to draw out insights. However, an important distinction should be made between this and what Creswell (2013) terms multiple or collective case studies; where cases are compared to each other in order to draw out common findings. Through a sociocultural lens, a finding from one case cannot be compared with a similar finding from another case because to do so assumes a positivist belief; that the accumulation of data leading to that finding is also comparable. In this study it is the discussion of case findings which surfaces insights, not cross-case comparison of the findings themselves.

Within this study there are three cases. The choice to restrict the number of cases to three was made so that the effort and focus could be placed on depth and quality of data generation and analysis, rather than a surface level synopsis (e.g. Bhattacharya, 2017; Kenneth, 2000).

Creswell and Creswell (2018) highlight the importance of defining the bounds of cases in order to be explicit about the focus and frame of data generation. In this study, each case is bound first by the individual teacher; specific to their previous experiences, the classes that they teach during data generation, and the school that they are working within. Furthermore, each case is bounded by the time and location of data generation. This is an important point because whilst the researcher may attempt to be explicit about assumptions and bias within methodology and analysis, it is much harder to be aware, let alone transparent and explicit about similar issues when experiencing (generating) the data itself (Hennick, Hutter and Bailey, 2011). For example, in an interview, a single word within a participant response may act as a catalyst for interpretation, and further discussion. Importantly, this interpretation is dependent on the many influences brought to the data by both participant and researcher at that moment in time (see Section 3.6.6 for research timeline). Such data generation then cannot be replicated because to do so would be to build the data on a different set of previous experiences. The ethics and reflexivity issues related to this are discussed in Section 3.5.

3.4 Location of Participants

Each case centres upon an individual teacher but it is not the teacher themselves that is the unit of analysis. As Matusov (2007) argues, many researchers seek to be holistic in their analysis and whilst less dangerous than reductionism, it is still methodologically incompatible with a sociocultural ontology. Matusov's (ibid), caution to be specific about the appropriate unit of analysis is central to ensuring robust probing and interpretation. Within a sociocultural study it is, as Rogoff (1990) set out, the active participation of participants in socially constructed practices that is the basic unit (or lens) of analysis. For this study, it is specifically the time and location bound data generated to surface each

teacher's pedagogical stance, and its relationship with uses of ICT in teaching practices that is the focal point within the lens of analysis. Wider data about the teacher become what Rogoff terms background planes; relevant to the study and contextualising the data but not the foreground plane of analysis. The Funnels of Influence model illustrates this by setting out the sociocultural formations (background planes) and the way in which they feed into teacher's espoused, intended and enacted practices. A subset of those practices contains material pertaining to the research questions (foreground planes). The funnels themselves were not discussed directly with those participating in the study.

Within sociocultural studies, sourcing participants plays a vital part of ensuring that the cases and findings become relatable without inferring that they are transferrable (Schoen, 2011). The cases within this study were sourced through existing professional networks where the schools were known within those networks to be open to visitors and stable in terms of their leadership, staff turnover, accountability outcomes and student numbers. The stability of the schools was considered in order to avoid data being unduly biased by temporary improvement initiatives or reactionary workloads. The relationship between the researcher and the schools in terms of pre-existing views on the school and those participating, and the ethics around power relations and researcher-participant dynamics are discussed in Section 3.5.4.

Schools, via the headteacher, were initially invited to be part of this study by email, using carefully worded text so as not to infer obligation (Appendix A). This approach was advantageous in terms of quick identification and simple logistical arrangements. However, it did also restrict the case selection to schools known to the researcher which brought existing relationship bias (discussed in Section 3.5.4). Section 2.3 drew attention to the ways in which teacher's pedagogical stance can differ even within the same school, and as such this study chose to spread the three cases across two schools to take this literature into account. Table 3.1 summarises key information about the two schools during data generation.

Table 3.1: Key information about participating schools

	School A	**School B**
School Type	State funded Primary (age 4-11)	Independent fee-paying Preparatory (age 3-13)
Accountable body	Charitable trust (4 school multi-academy trust)	Charitable trust (1 school)
Location	Located on the far outskirts of a large city in South East England, with farming fields to one side and a large dense housing estate to the other.	Located on the outskirts of a small city in South East England, with farming fields to one side, and a main road with large area of private housing on the other side.
Estate	Purpose built 1970s style building, with 3 playgrounds and a large field.	Combination of 19th century and purpose-built modern buildings, including 3 playgrounds and 2 large fields.

	School A continued…	***School B continued…***
Physical Capacity	1 large room per class plus additional rooms and spaces for designated purposes.	1 room per class or teacher plus additional rooms and spaces for designated purposes.
Most recent inspection	Ofsted Good (2017)	Independent Schools Inspectorate Good (2017)
Outcomes in relation to national expectations	Above average	Above average. 29% of previous cohort won scholarships to their chosen next school (2017)
Number of teaching staff	33 (including Senior Leadership Team	51 (including Senior Leadership Team)
Children on roll	502 12.5% SEND*, 1.6% EAL*, 35.3% FSM*	413 13% SEND*, 1% EAL*, 0% FSM*
	*Compared to the National Average which was 12.2% of children identified as having Special Educational Needs or Disabilities, 21.3% of children for whom English is an Additional Language, and 24.2% of children who are in receipt of Free School Meal.	
Children boarding	0%	122 (29.5%): 11 full time, 111 part time
School day	8:30am – 3:10pm (up to Year 2) or 3:25pm (Years 3-6) Monday to Friday	8:10am – 4pm (up to Year 3) or 6pm (Years 4-8) Monday to Friday 8:10am - Noon Saturday
Extra-curricular activities	8:00 – 4:15 Before and after school clubs - optional	Clubs during school day – all children

There are obvious differences between the schools, but for the purposes of this study which seeks to understand the specific features relating to a teacher's pedagogical stance and the uses of ICT in their teaching practices, the following influences sit under the term Constitutive Order (set out by Garfinkel (1967), and adopted into the Funnels of Influence model):

- Charitable trust legal and accountability frameworks
- Political agendas (relating to British government policies)
- Media and community expectations specific to state v. fee-paying
- Parental expectations specific to state v. fee-paying
- Cultural expectations of the community relating to the age of children attending and the perceived socio-economic backgrounds of children and staff
- Cultural and local perception of the role of the school
- Financial priorities, sources and pressures

Due to the extensive detail within each of these influences these are not discussed in any length. However, the interpretation of these expectations, accountabilities and how the schools have responded to them are outlined in the Arena data presented within each case.

Each of the 3 cases centred around an individual teacher. Cases 1 and 2 were located in School A, and Case 3 was located in School B. The table below summarises key information about the teachers in each case during the period of data generation (Table 3.2).

Table 3.2: Key information about participating teachers

	Teacher 1 (Case 1)	**Teacher 2** (Case 2)	**Teacher 3** (Case 3)
Located within	School A	School A	School B
Years Teaching	30 (mainly at this school)	5 (all at this school)	7 (across 3 schools)
Years of Senior Leadership experience	20 (at this school)	<1 (at this school)	3 (at 2 previous schools)
Qualifications	BA(Ed)	BA, PGCE	BA, PGCE
Position in school	Director of Teaching and Learning	Assistant Principal	Head of Subject and Form Tutor
Aspirations	Nearing retirement	Towards headship long term	Return to senior leadership
Teaching commitment	0.6 with 0.4 leadership	0.6 with 0.4 leadership	0.8 with 0.2 leadership
Known to the researcher prior to this study	Yes	No	No

It should be noted that all three cases focused on teachers who combined teaching with leadership roles. This was intentional in order to draw on the findings of a number of studies in Section 2.3 which found that more experienced teachers have clearer and more established views. It also counteracted issues caused by the majority of the research concerned with teacher identity having focused on early career teachers (the implications of which were discussed in Section 2.3).

3.5 Ethical considerations

This study is bound by the ethical guidelines of the British Educational Research Association (BERA, 2018). Furthermore, this study draws upon guidance that ethical matters should be woven throughout the research rather than solely as part of methodological considerations (e.g. Miller, 2012; Beach and Eriksson, 2010). For example, both researcher and participants bring with them biases, agendas and vulnerabilities which affect engagement and data generation and importantly, affect their experiences and future identities (e.g. Israel, 2015). Acknowledgement of these issues as affecting matters beyond the participation in data generation in turn affects the lens through which participation, data generation and analysis takes place and as such becomes part of the dataset itself (discussed in Section 3.5.4).

In order to address these issues this study draws upon what Stutchbury and Fox (2009) refer to as the four traditions of ethical thinking: Consequential ethics – that research should be worthwhile; Ecological ethics – that research should be conducted responsibly;

Relational ethics – that research should be conducted respectfully; and Deontological ethics – that research should be conducted correctly. Overarching ethical considerations are addressed below, and detailed ethical matters are embedded throughout the thesis.

The teachers who are featured in this research are considered to be gifting their words and actions to this research. As such, the researcher has a moral responsibility to recognise, respect, value and make purposeful use of the teachers' time and contributions throughout (Aluwihare-Samaranayake, 2012). This moral duty provided momentum to the researcher alongside a commitment to ensure that the study is undertaken robustly, as well as then offering an original contribution to the profession. Furthermore, surfacing matters relating to the formation of someone's values and beliefs is not a trivial process and in doing so the researcher was mindful of the psychological impact on the teachers surfacing deep and perhaps previously subconscious thoughts. Furthermore, the researcher needed to be sensitive to how such discussions might go on to feed into the teachers' evolving thinking about themselves, their professional identities, their practice and future aspirations. Thus, once the researcher was immersed in data generation with each teacher, nuances in question wording or responses reflected that duty of care for the teacher but may have biased the data itself. This is discussed in Section 3.5.4.

3.5.1 Ethical Approval

The Open University's Human Research Ethical Committee (HREC) gave a favourable opinion of this research (HREC/2698/Aubrey-Smith) and a submission was made to the Open University Data Protection Officer. Some minor amendments were made between the completion of the initial study and the main data generation which were documented and accepted by HREC and these are highlighted in Appendices E-I).

3.5.2 Obtaining informed consent

Once a willingness to engage had been expressed by the headteacher of each school, information sheets specific to the roles of headteacher and teacher were provided (Appendix B and C). These were discussed with potential participants and any questions addressed. Both headteachers and teachers informally confirmed their willingness to participate and they were then asked to sign the informed consent forms.

This research did not directly focus upon children, but children in the classes observed were considered contributors to the data generation by means of their presence within the teaching practice (Hill, 2005). Therefore, an information sheet was provided for all children in each observed class (Appendix D). This contained a version for their parents to read and a shortened, child-friendly version for parents to share with their child. Parents of all children involved in this study signed and returned those Informed Consent Forms.

All informed consent sheets specified that participants could withdraw from the study at any point up to a specified date at which transcription was due to be completed) by informing the researcher. However, no participant withdrew from this study nor were any concerns raised by any of those participating.

3.5.3 Safeguarding

The researcher also obtained an Enhanced Disclosure and Barring Service check which was shared with all participating schools, and adopted safeguarding procedures within each school. In addition, the researcher undertook updated school accredited safeguarding training which was above the requirements set out by either the British Educational Research Association (BERA, 2018), The Open University (2017) or the schools.

It should be noted that during one teacher interview, a potential safeguarding issue was surfaced. It was discussed with the supervision team, who sought further advice from the Head of the Postgraduate Research Team, a member of the OU Human Research Ethics Committee and the OU Safeguarding Officer. There was collective agreement that there had not been a disclosure nor were there any arising concerns for the safeguarding of either teacher, children nor researcher, and so no further action was taken.

3.5.4 Ethical considerations concerned with researcher reflexivity

As Matusov (2007) argues, to a sociocultural researcher the act of analysing data is seen as generating additional data. There are three threads to this point. First is that the researcher sees the teachers as co-owners of the data and therefore to be an ethically responsible researcher, the teachers should have the opportunity to review and give their opinion on the data which ultimately describes them. This helps to clarify data which emerges directly from the respondent and data the researcher perceives or infers from the respondent (Hammersley and Atkinson, 2010). Furthermore, participants sometimes say things during the interview that differ from what they believe or think before or after the interview (Burgess, 1990, p.28). To address these issues, transcripts were sent to participants after they had been written up but before further analysis had begun. Teachers were invited to reflect and comment upon their words and intentions. There are two reasons this matter is surfaced within a discussion about reflexivity. First is that once the researcher decided to offer this opportunity to participants it formed part of the lens through which interpretation was viewed. As Hammersley and Atkinson (2010) argue, this is unsurprising given that researchers rarely leave fieldwork unaffected by it. Second, is that whilst all of the teachers replied that they were happy with the transcripts which they viewed as a fair reflection of the discussions, the nature of their responses provided further data. For example, Teacher 3 noted, with humour, their high level of utterances (e.g. ‘erm’) and Teacher 2 sought clarification about how the transcript would be published

requesting specifically that the transcripts would not be published in full. The commitment not to publish full transcripts was made to all participating teachers and as such just the cited extracts have been included in this thesis. Each of these responses shed subtle and further light on the teachers, thus became part of the data generation itself.

An additional matter which affects reflexivity is that the researcher and teachers have different interests in this study. Although both wish to extend knowledge within the field, the researcher is orchestrating this study and the teachers are offering case insights. Through orchestration, the researcher moves their contribution into the public domain as identifiable and attributable for the content and quality of the work. The teachers, whilst anonymised, are not completely untraceable due to the small number of cases, and the knowledge about their participation by their headteachers and colleagues (particularly for Cases 1 and 2 who worked in the same school). Consequently, it is possible that the information in this thesis could surface detail about the teachers to those known to them. This kind of post-publication ethical consideration is important to consider at the data generation point because once the researcher is aware of this possibility it may affect the way in which data is captured, viewed and handled. The researcher may draw conclusions and respond with a bias to present the teacher as the researcher perceives that the teacher wants to be presented. This could compromise the findings. Mitigation is through surfacing assumptions about inference as much as is possible. An example of this taking place within this study is through the interpretation of observation data. Teacher 1 was observed as greeting children at the classroom door and this was, in the context of that teacher, seen as aligning with their espoused views about welcoming children into the classroom and attempting to give children a sense of belonging. However, when the researcher observed Teacher 3 greeting children at their classroom door, this was, in the context of that teacher, seen as a power symbol because of their espoused views about the teacher being seen by the children as an authority figure. Thus, the two teachers, carrying out the same action – greeting children at the classroom door – were interpreted differently as a result of the teacher's espoused views. The problem becomes that that interpretation sets the tone for what the researcher then sees for the rest of that observation; making the researcher more likely to see Teacher 1 as welcoming and supportive, and Teacher 3 as authority focused. But the real problem is that those interpretations in-situ, may be the correct ones and thus become part of the data which surfaces evidence for particular findings, or may be incorrect ones and thus introduce a bias and blindness to data which might be contradictory. The researcher must thus attempt, both during data generation, in-situ interpretation and in analysis, to strike a delicate balance of considering multiple possibilities for each action, whilst also recognising that instinct (e.g. Lea, 2015; Birney and Teevan, 1961) - based on a far

broader dataset than that which is captured (e.g. Maslow, 1954) - plays an important role in emergent findings.

3.5.5 Researcher reflexivity

The researcher brought a set of baggage about what 'the system' expected which was tied to practical first-hand classroom experience. However, after the researcher moved out of the classroom professionally, both national accountability and professional learning expectations changed, as did the researcher's own evolving views. This meant that the researcher's expectations about classroom practice were not as aligned with current class teachers as the researcher's teacher-identity would suggest. Furthermore, the researcher, by nature of having carried out broad strategic roles for educational organisations had been privy to a wide range of professional learning about improving teaching and learning, but usually without means to apply them (and thus experience them first-hand) within the classroom. The researcher was very aware of a tendency to assume that teachers are aware of professional strategies and approaches that they may not necessarily have yet had exposure to. This again affected how the researcher might have viewed any classroom teacher. By being aware of these issues, the researcher was more able to identify biases and points of friction within data generation and thereafter.

The researcher had a pre-existing professional relationship with School A and had worked with Headteacher 1 and Teacher 1, although not Teacher 2, previously (although not closely or recently). Furthermore, that relationship was expected to continue longer term. As a result of that relationship there were pre-existing positive views of the school and participants. The relationship was not one of direct leadership or governance, and so was not considered to affect power relations on the part of either researcher or participants but did create some assumptions about pre-existing knowledge within interviews and observations. As such, attempts were made throughout data generation to ask follow-up questions where it appeared that such assumptions were being made. The researcher did not have a pre-existing relationship with School B (including Headteacher 2 or Teacher 3).

3.6 Data Generation

Data was generated during researcher visits to participants' schools between January 2018 and April 2019. The process of that data generation is now set out.

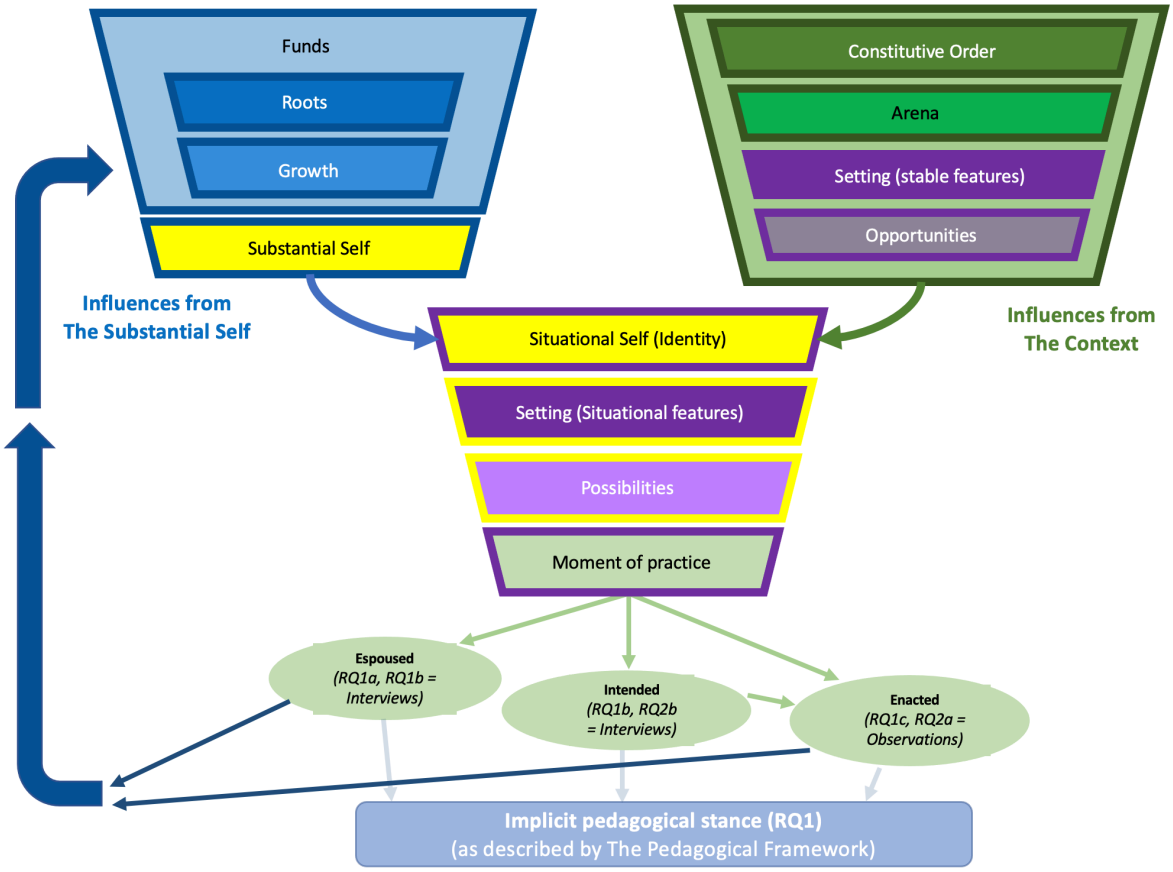
3.6.1 The relationship between the literature review and chosen methods

As Twining et al. (2017) set out, a choice of methods is in itself a form of interpretation because it prioritises elements within the data. Furthermore, there are limitations about what can be assumed about data prior to a data collection phase. As Garnham (2008) argues, data are not considered to be 'out there' just waiting to be collected, thus data

generation (active co-construction) rather than data collection (with its inference that data exists in isolation of the researcher) is a more appropriate term.

As a result of the literature review, The Funnels of Influence Model (Section 2.4.3) was created. That model synthesises what the literature set out as the most relevant data to generate in order to respond to the research questions within this study. Each aspect of the model reflects a unique set of influences which will affect the teacher's espoused, intended, enacted and therefore implicit pedagogical stance. Identification of these influences enables the researcher to go beyond face-value interpretations in order to reach more credible descriptions. The Funnels of Influence model, and how the chosen methods draw out relevant data (in italics) can be seen in Figure 3.2.

Figure 3.2: The Funnels of Influence model, highlighting methods and research questions



The model provides a deductive mechanism for generating and analysing data rather than a focal point itself. However this study is not a deductive one; it is not seeking data which supports a rule or theory (Reichertz, 2007). Initially it was conceived that the study was inductive; which Thornberg and Charmaz (2014) describe as when empirical cases are used to identify a pattern from which to make a general statement. However, as Shaffer (2017) and Matusov (2007) both argue, patterns across cases where the underlying data is not consistent can create friction with the lens through which this study is viewed. Therefore the abductive approach is a more appropriate explanation; with Kennedy (2018) describing abduction as seeking cause-and-effect relationships within data. Specifically, abduction is about discovering new ideas and explanations by finding surprising

phenomena or data, rather than induction which seeks to determine more general rules. This aligns more comfortably with the cases being seen as relatable rather than transferrable.

The arguments above also highlight the importance of choosing methods which allow for disciplined data generation (to ensure sufficient data to surface each aspect of the funnels model), alongside open-mindedness (to ensure freedom within data generation to surface what the Johari Window terms “the not known unknowns” (Ryan, 2018; Justo, 2019).

3.6.2 Rationale for chosen methods

Data generation took place through a combination of semi-structured interviews and observations (set out in Section 3.6.4 and 3.6.5). The term ‘semi-structured’ is used only to refer to the presence of interview and observation guides (Appendices E-I). Guides were designed as a set of prompts to aid the researcher in terms of coverage to avoid becoming absorbed by one particular aspect of conversation or observation. It is important to note this because through a sociocultural lens one should not approach interviews or observations, particularly within a case study context, with pre-conceived ideas about what might emerge (Yin, 2018). However, as an education professional, the researcher brings preconceptions – a repertoire of existing knowledge - about what may happen within a lesson, borne out of direct teaching experience, leadership roles and professional work with inspectors and consultants. This leads to the researcher becoming part of the research instrument itself (Lincoln and Guba,1985). Furthermore, as a teacher or school leader, one is trained to look for specific things during lessons, whereas as a researcher one should view lessons from a different perspective. A researcher who works professionally with schools sits somewhere along that continuum; neither an insider nor an outsider (Hammersley, 1995). Furthermore, there will always be pre-existing beliefs about what teaching is and how it is described and enacted, which may or may not align with accountability or policy models (or the observed teachers’ views). These assumptions affect researcher responses and can influence consequential discourse and interpretation. Therefore, by surfacing the interview and observation guides, the researcher makes these preconceptions transparent to the reader, as well as ensuring discipline within the data generation itself.

3.6.3 Data generation methods

Data generation took place through a sequence of interviews and observations. Table 3.3 cross references the data collection method with the key objective, matched to the research question.

Table 3.3: Sequence of data generation and the objectives for each instrument

Sequence of Data Generation	Objective
Headteacher Interview	To learn about the school Arena (supporting RQ1 and RQ2) and the influences that affect these (Funnels of Influence).
Teacher Interview 1	To learn about the teacher's espoused pedagogical stance (RQ1a), how they talk about using ICT in their practice (RQ2b) and the influences that affect these (Funnels of Influence).
Teacher Interview 2	To learn about the teacher's intended practice for a lesson that will then be observed (RQ1b), how they talk about using ICT in their practice (RQ2b), and the influences that affect these (Funnels of Influence).
Teacher Observation/s	To learn about the teacher's enacted pedagogical stance (RQ1c), uses (or absence) of ICT in their teaching practices (RQ2a) and the influences that affect these (Funnels of Influence).
Teacher Interview 3	To learn about the teacher's views on the lesson that has been observed (RQ1a), how their enacted practice compares to their intended practice (RQ1b-c), how they talk about using ICT in their practice (RQ2b) and the influences that affect these (Funnels of Influence).
Key	
RQ1	What is the teacher's implicit pedagogical stance?
RQ1a	*What is their espoused pedagogical stance?*
RQ1b	*What is their intended pedagogical stance?*
RQ1c	*What is their enacted pedagogical stance?*
RQ2	How does the teacher use ICT in their teaching?
RQ2a	*What does observation of the teacher's practice reveal about their uses of ICT?*
RQ2b	*What did the teacher say about using ICT in their teaching practice?*

3.6.4 Semi-Structured Interviews

Semi-structured interviews enable planned questions, stimuli and coverage but do not restrict the researcher or participant where probing more deeply appears to be valuable to the underlying research questions (e.g. Bogdan and Biklen, 2003; Kvale, 1996). Studies discussed in Chapter 2 successfully used semi-structured interviews to draw out detail through narrative (e.g. Bien and Selland, 2018; Twining, Browne, et al., 2017; Lee and Schallert, 2016; Priestley et al., 2015; Chang-Kredl and Kingsley, 2014; Bogdan and Biklen, 2003).

Interview questions sought to encourage straightforward responses (e.g. regarding the nature of routines or logistics), as well as more complex data (e.g. reflections on past events, or perceived expectations). During the interviews the use of spoken language by the researcher - both planned and responsive - was carefully considered so as to be encouraging, supportive and respectful. Follow up questions were also used to avoid implying assumed knowledge, shared vocabulary or inferred expectations about the teacher's skills and understanding, which were noted to be issues in related research (e.g.

Chang-Kredl and Kingsley, 2014; Pillen et al., 2013; Husu and Tirri, 2007). Interviews were video recorded to aid transcription and analysis of both the spoken word and non-spoken communication such as eye contact and body language.

The ways that the researcher conducts themselves throughout interview processes impacts data (Mays & Pope, 1996). There were three main threads in this research. First, every utterance and movement undertaken by the researcher (often subconscious) could have influenced teacher responses, creating a data bias (e.g. Morrow, 2005). Being aware of this, the researcher responses attempted to use verbal and physical cues to encourage the teacher to talk, build rapport, and build the teacher's confidence that the researcher had an empathy for what they were espousing (e.g. Berger, 2015). Such attempts included everyday social cues such as smiling, nodding in agreement, and use of the word 'yes' as a mid-response utterance (e.g. Jucker and Smith, 1998; Schiffrin, 1987). In this study, such responses were dependent on the researcher's conscious awareness of both the discourse as well as any subtleties which may have been portraying researcher bias. In practice, this was difficult as it required the researcher to split focus between the interview or observation content, and the researcher's own behaviours. Furthermore, where reflexivity becomes part of both the data generation and the reflection-in-action analysis (Schon, 1987), the researcher can only surface their influence as often as they are able to identify it.

Second, is that as the teacher responded to questions, the researcher was reflecting-in-action (Schon, 1987), and then immediately responding with further probing questions. The lack of time to consider how best to phrase these questions meant that on some occasions the researcher phrasing created a bias which framed further discussion. For example:

> Researcher: "there are two really strong themes coming out to me from what you're saying about digital technologies; their presence and their use and then… in parallel to that what's going on with teaching and learning and the ways in which you're thinking about teaching and learning." (T1-1b,2.38).

This framing may have caused the teacher to conceptualise or espouse references to ICT differently. For example, immediately before the extract above the teacher had spoken about ICT uses with an emphasis on what was available. Whereas, following the researcher's comment the teacher spoke more about the impact on their pedagogy. For example, about changes to the way in which they provided video feedback to children via an app called SeeSaw, and how they had adjusted their questioning style as a result of the analytics provided through a teacher lesson observation app.

Still within the data generation phase, the third way that data reflexivity created a bias was through the preparations for school visits. For example, between the initial and second

visits to Case 3, transcription surfaced the teacher as using the phrase 'you know' 197 times in the initial visit interviews. A brief probe into related literature identified 'you know' as a discourse marker; used by the speaker as a stalling device (e.g. Fox, Tree and Schrock, 2002, Jucker and Smith, 1998), and to bring inferred agreement between the speaker and audience (e.g. Schiffrin, 1987; Schourup, 1985; Ostman, 1981). This reflexivity meant that later data generation and analysis focused more on understanding the teacher's view on knowledge and control, confidence in espousing views, and extent to which they are reflexive or reflective within their practice. In other words, the identification of that discourse marker enabled the researcher to probe the matters that the teacher was referring to in a deeper way than might otherwise have been the case.

3.6.5 Semi-Structured Observations

Semi-structured observations were used to explore practice in a systematic but not pre-determined manner (e.g. Cohen et al., 2000). By experiencing the teacher's practice, data became surfaced which confirmed or contradicted interview data or raised issues to be further explored. An observation guide (Appendix I) was drafted in order to maintain focus whilst allowing a reflexive response to the sequences of actions, interactions and relationships within the observed lesson. To support this reflexivity the researcher remained present during the observation rather than filming the classroom remotely, in order to follow up on specific actions as they occurred (e.g. asking children during the lesson about what they were doing).

Case 1 and 2 observations were video recorded, with the focus being on the teacher and their actions. For Case 3 school policy prevented video recording and so only audio recording took place. During the audio recorded observations additional field notes were taken to mitigate the absence of visual data; including teacher and child locations within the room, body language during the lesson, additional information describing teaching and learning resources and equipment, and non-verbal interactions between actors. Field notes were written using a small notepad and pencil. As both teacher and children were aware that ICT was the focus of the research, the researcher conceived that using a digital device may infer expectations about ICT use within the lesson being observed which could affect data. The researcher moved discretely around the room, varying standing/sitting, position within the room, and ensuring engagement with a majority of the children at some point during each observation to ensure a range of perspectives.

Interview questions and observation prompts, as set out in the Instrument guides (Appendices E-I), were designed to generate and surface data which the Funnels of Influence model identified as most relevant to responding to this study's research questions. An example of this can be seen in Table 3.4 below.

Table 3.4: Example of relationship between the Funnels of Influence model and interview questions/observation prompts

Teacher Interview 2 (pre-observation)		
1	**Questions to generate data about Intentions (RQ1b)** What are your intentions for this lesson? How have you planned for these to happen? What documentation supports this – e.g. plans, assessment records, class data. Why do you want these things to happen? Who is involved in this lesson and why? What is their role?	Identity, Agency Arena Expectations, Opportunities, Setting, Possibilities, Actors Pedagogical Model (TPF)
2	**Questions to generate data about Influences (RQ3)** Who or what determines what you will be teaching? (leaders, policy, children's demographics and needs?) How much influence do you have over what this lesson is about, and how it will take place? How does that affect what you do and how you do it? If those influences were removed what would you do differently?	Arena Expectations, Opportunities, Setting, Possibilities, Actors Agency Reflectivity, Identity Pedagogical Model (TPF)
3	**Questions to generate data about views on teaching and learning - TPF (RQ1)** How does this lesson relate to prior learning?	Identity Pedagogical Model (TPF)
4	**Questions to generate data about views on Education and Schooling - TPF (RQ1)** How does this lesson relate to the children's lives beyond school?	Identity Pedagogical Model (TPF)
5	**Questions to generate data about views on learners and learning, teachers and teaching, and views on knowledge - TPF (RQ1)** How will the children be organised – locations, groups, timing, activities? Why is this? Are there specific children who will need additional support? Who are they? Why do they need this support and how will it be provided?	Identity, Agency Arena Expectations, Opportunities, Setting, Possibilities, Actors Pedagogical Model (TPF)

3.6.6 Research Timeline

Data generation took place over 16 months. An initial study was carried out with Teacher 1 in January 2018. Analysis from that initial study indicated that additional follow up interviews and observations would be necessary in order to generate data which would clarify initial interpretations and findings. These additional visits were incorporated into the main data generation planning. The initial case was accordingly expanded to become Case 1 in the main data generation, and two additional cases were added. As a result of the initial study some refinements were made to the questions and prompts within the Interview and Observation Guides (shown in italics in Appendices E-I). A summary of the timeline and content of data generation for each case can be found in Table 3.5 below.

Table 3.5: Summary of the sequence of data generation

Case	Visit	Date	Data Generated (Instrument)	Location	Transcript File References
Case 1	Day 1	22-Jan-18	Headteacher Interview	HT Office	HT1
		22-Jan-18	Teacher Pedagogy & ICT Interview	Teacher's Classroom	T1-1a
	Day 2	24-Jan-18	Teacher Pedagogy & ICT Interview	Teacher's Classroom	T1-1b, 1c
		24-Jan-18	Teacher Pedagogy & ICT Interview	Staffroom	T1-1d
		24-Jan-18	Pre-observation interview	Staffroom	T1-2a
		24-Jan-18	Observation 1 (18 children)	Intervention Classroom	T1, Obs.1
		24-Jan-18	Post-observation interview	Intervention Classroom	T1-3a
		24-Jan-18	Pre-observation Interview	Intervention Classroom	T1-2b
		24-Jan-18	Observation 2 (4 children)	Intervention Classroom	T1, Obs. 2
		24-Jan-18	Post-observation interview	Intervention Classroom	T1-3b
	Day 3	20-Jun-18	Pre-observation Interview	Intervention Classroom	T1-4a
		20-Jun-18	Observation 3 (4 children)	Intervention Classroom	T1, Obs. 3
		20-Jun-18	Post-observation interview	Intervention Classroom	T1-4b
Case 3	Day 1	29-Nov-18	Headteacher Interview	HT Office	HT3
		29-Nov-18	Teacher Pedagogy & ICT Interview	Teacher's Classroom	T3, 2-1
		29-Nov-18	Pre-observation Interview	Teacher's Classroom	T3, 2-1
		29-Nov-18	Observation 1 (20 children)	Teacher's Classroom	T3, Obs. 1
	Day 2	17-Jan-19	Pre-observation Interview	Teacher's Classroom	T3, 2-2
		17-Jan-19	Observation 2 (20 children)	Teacher's Classroom	T3, Obs. 2
		17-Jan-19	Post-then Pre-observation interview	Teacher's Classroom	T3, 2-3
		17-Jan-19	Observation 3 (20 children)	Teacher's Classroom	T3, Obs. 3
		17-Jan-19	Post-observation interview	Teacher's Classroom	T3, 2-4
Case 2	Day 1	22-Jan-18	Headteacher Interview	HT Office	HT1
	Day 2	30-Jan-19	Teacher Pedagogy & ICT Interview	Radio Station Room	T2-1
		30-Jan-19	Pre-observation interview	Radio Station Room	T2-1
		30-Jan-19	Observation 1 (10 children)	Learning Hub	T2, Obs. 1
		30-Jan-19	Post-observation interview	Learning Hub	T2-2
		30-Jan-19	Teacher Pedagogy & ICT Interview	Learning Hub	T2-3, T2-4
		01-Apr-19	Pre-observation interview	Intervention Classroom	T2-5
	Day 3	01-Apr-19	Observation 2 (5 children)	Intervention Classroom	T2, Obs. 2
		01-Apr-19	Post-observation interview	Intervention Classroom	T2-6

Within Table 3.5 an indexing system for referencing interviews and observation data is introduced. Participants are identified as T1 (Teacher 1), T2 (Teacher 2) and T3 (Teacher 3). Headteachers are identified as HT1 (the same person for Case 1 and 2), and HT2 (for Case 3).

For each case there were multiple visits to the school and each visit consisted of a combination of interviews and observations. Table 3.5 indicates where teachers were interviewed about:

- Pedagogy and ICT (for interview guide see Appendix F)
- Observations (see pre-observation interview guide in Appendix G, observation guide in Appendix I and post-observation guide in Appendix H)

The interviews were conducted reflexively, responding to matters surfaced and this meant that most interview sessions included content drawn from more than one instrument. Matters pertaining to pedagogy and ICT in particular spanned across most interviews as teachers sought to contextualise discourse about observations. The interviews are

therefore not numbered according to the instruments, but instead according to the chronology that they took place in. This preserved the integrity of how data accumulated. As can be seen in Table 3.7 in column 6, for Teachers 1 and 3 there was a chronological sequence of 4 interviews (e.g. T3-1, T3-2, T3-3, T3-4), and for Teacher 2 there were 6. These numbers differ because the interviews were scheduled to work around each teacher's timetable and the pockets of time they had available to fit the research interviews into. Furthermore, when interviewing Teacher 1, the location of the interview was disrupted mid-flow which meant moving to another room and starting a new recording within the same interview. The timestamps reflect this with the addition of a letter (e.g. T1-1a, T1-1b).

Interviews and observations were arranged around the teacher's normal teaching timetable and commitments. This meant that for all three cases, each observation was with of a different group of children. The spacing of the visits enabled the researcher to review the data after each visit and then to identify specific foci for the follow up interviews and observations. Appendices K-M contain the additional planned questions.

3.7 Processing data

3.7.1 Transcription

As introduced above, once each school visit had taken place the interview and observation data were transcribed. As Davidson (2009) argues, the role of transcription within qualitative research is a reflexive process that captures and affirms the transcriber's theoretical position. Therefore, if the transcriber is not the researcher this creates friction within the ontology and epistemology of the research itself. As Jenks (2018) argues, two separate people will have a different lens on what they see and interpret within data being transcribed which means that the act of transcribing requires the transcriber to make decisions about precisely what to include and how to capture their perception of what is being conveyed. Therefore, in a study such as this one - which emphasises that words and actions must not be taken at face value and recognises the influences of prior experiences in interpreting current ones (Section 2.4) - transcription must be completed by the researcher themselves. Furthermore, the process of transcription aids familiarity with the data itself. Green et al. (2007) argued that complete immersion brings depth to the data and enables subsequent interpretation to fully account for the research context beyond the transcribed word. Thus, the researcher transcribed all of the interviews and observations.

3.7.2 Interview data

Audio and video interview recordings were reviewed and transcribed verbatim into spreadsheets, with each case's interview data contained entirely within one sheet. Each new row represented a change of speaker or change of focus. Discourse that was of

peripheral interest was thus maintained within the transcript, but signposting enabled a clear focus on research aims and questions. Recordings were re-played countless times to be sure of exact wording and to capture non-lexical detail; pauses, intonation, body language and notable changes in eye direction. Jenks (2018) argued the importance of this form of open transcript as consistent with a researcher who is theoretically motivated to treat all transcribed social interaction as potentially important. Furthermore, he argued that the researcher will not know at this stage which specific aspects will later be pivotal therefore approaching transcripts this way maintains integrity of the whole dataset.

The second feature of the transcription is that it followed what Oliver et al. (2005) describe as a naturalist transcription; where utterances and idiosyncratic elements of speech within discourse are transcribed (e.g. “er”, “um”). Denaturalised transcriptions which treat words as entirely representative of meaning are neglectfully simplistic and cannot be described as transparent representations of interviews or those participating within them. The argument for naturalist transcription aligns with the belief that what we say and how we say it reflects the way in which we are understood, the information that is shared, and conclusions that are therefore drawn (Hamachek, 1999; Tannen et al., 2015). It should be noted that given the parameters of this study the non-lexical aspects of the data were noted succinctly rather than forensically (e.g. focused or avoidance of eye contact rather than devoted technical eye-tracking). An example of these details can be seen in the second and fourth columns of the transcript extract in Figure 3.3. (Note: Bold text indicates key data or overarching points).

Figure 3.3: Example of interview transcript

	Transcription of words used by the researcher and interviewee, and an indication of pauses		**Non-verbal and implications; eye-contact, body language**
Timing	**Teacher**	**Researcher**	
08:28	The depth that we’re having to go into is phenomenal… **Subject knowledge… is critical. If you don’t** have the **subject knowledge, and an understanding, not of the progression of.. or the sequence of learning** as such… but [tut] erm… but if you don’t have **that depth of understanding of something that enables you to see all the links and connections that you can make**		Looks down right then back at researcher. Pointing single finger in air to illustrate
09:00		It’s like subject pedagogical knowledge…	
09:02	absolutely. Without that then what you get is a **very static delivery** of something… erm… and unfortunately **people don’t necessarily have that depth of subject knowledge.**		Points single fingers on table. Silent pauses (…) whilst thinking - reflective facial expression - before proceeding

Transcribed data is set out in a spreadsheet to provide what Shaffer (2017, p.126) calls "evidentiary completeness"; with all captured data sitting in the first four columns (labelled as Timestamp, Teacher, Researcher and Non-Verbal in Figure 3.3). Shaffer emphasises the importance of well-formed data tables as integral to the discipline of methodically reviewing data. In this study, each line of the data is seen as dependent on the inferred or shared meaning created by the full chronology of data which came before it, not just contextualised by the data immediately surrounding it (Tannen et al., 2015). Discourse analysis terms this intertextuality; where the transcript can be seen as layers of interwoven texts which reference each other (Hodges, 2015). Furthermore, one must be aware of the dialogic overtones; where a word, phrase, or non-verbal feature is used to signpost shared meaning or previously referenced aspects within it.

Discourse includes both sound and silence. Both of which convey meaning and yet the role of silence is often ignored by those analysing interview data (Bengtsson and Fynbo, 2018). As Ephratt (2008) set out, silence is used for many different reasons (e.g. to recall information, to consider a response or the framing of a response, to indicate a desire *not* to respond, to cause humour or discomfort, to suggest a change of subject, etc.). During data generation the researcher is reflexively responding to what is perceived to be the reason for the silence and thus affecting the data that follows. For example, literature on discourse analysis suggests that if the researcher perceives the teacher to be struggling to think of a response then they may provide further prompts which could in turn mistakenly steer the teacher's thinking towards, or away from, particular ideas (Ephratt, 2008). Transcripts therefore use […] to signify a short silent pause, with square bracketed comments indicating longer silences or describing features of the silence or pause (e.g. simultaneous body language).

Within the transcripts the indexing convention introduced in Section 3.6.6 is complemented by the addition of a timestamp which shows in minutes and seconds, the start of the section where relevant material was located (e.g. T2-1, 1.34, would mean Teacher 2, first chronological interview, data that starts at 1 minute 34 seconds into that interview).

3.7.3 Coding transcripts

Shaffer (2017) argued that coding applied to well-formed data tables (as outlined above) allows for data to be probed collectively. In setting out 32 different methods of coding qualitative data, Saldaña (2013) advised caution in choosing coding methods or even to code at all. He explained coding as researcher-generated constructs that symbolise and attribute interpreted meaning to data for later analytic purposes such as detecting patterns, categorisation or theory building. For this study, where meaning is seen as accumulating through the generation of the data (Section 2.4), this presents a problem. To

code data for the purposes of later sorting the data would be to fragment the accumulation within the data and thus the meaning. Furthermore, detailed coding methods assign inferred meaning to words, phrases and examples chosen by the participant. This is problematic because it assumes that discourse choice is intentional rather than subconscious, which as Section 2.3 set out is not always the case. As Cruickshank (2012) argued in a literature review about the role of qualitative interviews, the focus of analysis can often mistakenly become the transcript text content rather than the subject matter of the interview. Therefore, this study utilises coding just as a form of signposting.

Drawing upon Saldaña's (2013) definitions, two kinds of coding were adopted: structural coding (labelling a segment of data with a research question or area of inquiry); and descriptive coding (summarising the topic of a passage of data). Structural coding was used to cross reference data generation with the Funnels of Influence Model (ensuring sufficient data generation had taken place), and to signpost areas of data to Research Questions (to aid later analysis). Additional columns of the transcript spreadsheet contained the assigned code and accompanying notes highlighting related aspects of the data. Descriptive coding was used to summarise key points and how they related to other areas of the transcript, or to observation data. A summary of the transcript columns and coding can be seen in Table 3.8 below.

Table 3.6: Summary of transcript columns and applicable coding protocols

Transcript Column	**Coding Used**
Interview reference and time stamp	Transcribed data
Teacher discourse and/or researcher discourse	
Non-verbal aspects (e.g. eye contact, body language) and its relationship to spoken words	
Links to research questions – with separate columns for each RQ	Structural coding - RQ1, RQ2, RQ3 - with notes about key points
Links to aspects of the Funnels of influence - with separate columns for each funnel	Structural coding - Constitutive Order, Arena, Setting, Roots, Growth, Identity, Opportunities, Possibilities, Agency - with notes about key points
Relationships to other areas of the transcript	Descriptive coding - with timestamp reference
Relationships to observations	Descriptive coding - with vignette reference
Additional data requirements	Description of what to follow up on next visit

An example of the descriptive coding can be seen in Figure 3.4. The columns signpost first the research questions and then the relevant aspect of the Funnels of influence model. The narrative alongside the descriptive codes provided descriptive terms used to draw out key points. This signposting, within a spreadsheet, enabled the researcher to easily find and re-visit data in its original context. This approach maintained the integrity of the data chronology and accumulated meaning as discussed in Sections 3.7.1 and 3.7.2.

Figure 3.4: Interview transcript signposting Research Questions and Funnels of Influence aspects

	Transcription of words used by the researcher and interviewee, and an indication of pauses and emphases within speech.
Timing	**Teacher**
03:04	[long pause] erm [exhale], right school wise… erm [pause] **It has changed things that I do** [sighing slightly and slower speaking] because for example before **I would probably have taken all the books in and then I would have marked each book separately and then I would have given the books back** out so that **everyone would know what they are doing the next day but very much on an individual basis**. What I tend to do now is **I pile the books up according to construct and then I will select a pile of books to look for the common theme**, I will take the photo… and then the **feedback will be generic for that group**… So I'm not writing it in to the book it's a generic piece of feedback so **everyone in that group that I've identified that day following assessment needs that particular input so they have that input, they look at the feedback and then that moves their learning on**. Instead of writing in everyone's book the same thing. So I think that's probably the biggest…

In columns to the right of the data above further columns coded this data as;

Links to specific research questions		**Links to the Funnels of Influence Model**		
RQ1	RQ2	**Setting** (marking - expectations, nature of marking, how it's done, equipment/resources available, classroom structure and set up, timetable allowing feedback to be done in this way).	**Agency** (feels able to make this change - not school policy to do or not do this way).	**Growth** (reflecting on previous marking processes and how they were experienced)

3.7.4 Observation data

Due to the nature of the participants' teaching roles, each lesson observation was with a different group of children. For each lesson observed there were two sets of data; interview data generated about the lesson before and after the lesson took place – which were treated as interview data (see Section 3.7.2 above), and data generated during the lesson itself (referred to hereafter as observation data).

Recordings were reviewed multiple times in order to become fully immersed within the data that was unseen during the physical experience of the observation (Corbetta, 2003). Vignettes were created to capture key features of enacted practice in relation to pedagogical stance (RQ1c); a detailed transcription of the observation recordings (in the way that had taken place for interviews) was not considered necessary. However, given the number of people within each observation, pace of physical movement, and complexities of the dynamics between each of the people present, some pragmatic decisions were required about what to summarise in the vignettes. The vignettes therefore focused on lesson logistics, style of teacher actions and interaction, expectations of children and children's actions. These areas of focus corresponded with the key features of The Pedagogical Framework (Section 2.3) in order to support later analysis.

Each vignette therefore became a summary of the experience, captured in chronological order and presented as a table within a spreadsheet. The full vignettes can be found in Appendices P-R and an extract shown in Figure 3.5.

Figure 3.5: Observation Vignette example

Case 3, Observation 2 - Year 6 French Lesson	
Observation Reference	**Observation Field Notes**
1.1	This was of a 45 minute top set Year 6 French class, in the teacher's usual classroom. Prior to the lesson the teacher explained that this group were being prepared for the Common Entrance Exam (CEE) in two years time (they remain at this school until year 8, whereby most go on to fee paying secondary schools). This was particularly relevant as the CEE expectations were felt to be about equivalent to GCSE-to-A level French, rather than the standards expected in state school year 8, and so by year 6 they needed to be working nearer to GCSE French in order to be sure of passing the exam, and ideally, earning scholarships; both of which were perceived as important by the school and by parents of these children.
1.2	Prior to this lesson, as 'prep' (homework – which is not necessarily done at home, but in timetabled prep sessions which take place before, during and after school lessons), the children had written a paragraph about the town that they live in or visit regularly (about 25% of the children board at this school at least part time).
1.3	The children lined up outside of the classroom and were welcomed in by the teacher standing at the door at the start of the lesson; greeting them each as they came in. Children brought large pencil cases and exercise books with them, and seated themselves in the row-based seating relatively quickly.

Once the vignette tables were created, they were reviewed and compared to the transcripts from pre- and post- observation interviews. Relevant aspects of those transcripts were then copied into a column to the right of the vignette to aid easier collation of relevant data. Interview timestamps were used to signpost interview data back to its original context. As a result of the pre- and post- interview data being focused on the lesson observation itself, interpretations about which parts of the data were relevant were straightforward. However, there were instances where interview data were relevant to more than one part of the vignette, and in those instances, it was copied across to both vignette sections. Additionally, there was some data that did not relate directly to the observed lesson (e.g. where discourse in pre- or post- observation interviews had flowed to other topics), and so that data remained in the interview transcripts and treated as part of the interview transcript analysis. Figure 3.6 shows an example of a vignette with its accompanying interview data.

Figure 3.6: Observation Vignette with related interview data

Case 1 – Observation 1 - Year 6 Maths Lesson			
Obs. Ref.	**Observation Field Notes**	**Related teacher interview data**	**Insights to Implicit Pedagogical Values and Beliefs**
1.5	The children were seated as boy/girl pairs based on their attainment in the previous lesson which encouraged dialogue to focus on learning - this seating was specific to the lesson and the children were directed to where they were to sit as they arrived at the classroom.	"And then in will organise them into piles in terms of who's where. And so tomorrow when they come in they could well be sat with someone else, so they're not static groups at all, but they're totally responsive to assessment. Well the thing about that is that they have to get good at talking because the first thing will be communicate with your partner where you got to yesterday what you feel your next steps are and how they can help you." (T1-3a, 0.00). So where they were sat today, that isn't necessarily the person who they would have necessarily started the week with but it was based on what I did on Friday to identify where I thought they were." (T1-3a, 0.42). "It's a thing I introduced at the beginning of this academic year, no last academic year." (T1-3a, 1.04). "I think it's helped learning because there isn't that… you know you get little cliques of children sat together… there is none of that so they are more focused on what the learning is that's going on in the lesson. Most definitely. And they're quite focused on what they're doing any not someone else… Completely equitable. And depending on where they reach today depends on where they will be tomorrow. You know as to who needs what input from the start, so it might not be 'that' group (indicates higher working group), you know, they… it depends on what we are doing. Erm… they might… yeah… they might… more often they might start together, but tomorrow I know there are some children who will interact with them now, so in fact tomorrow I will probably split them up into two pairs, again boy girl, and then move those along some others." (T1-3a, 1.24)	The role of **Assessment for Learning** is central to how she organises her teaching and learning provision. The **Social aspects of Learning** (e.g. **talking** about learning), are things she has **chosen** to do not things she has been expected to do, and she is able to explain why she chose to do them and what the impact has been.

Each vignette has a number indicating the case it belongs to and then the observation within that case (e.g. T1-Obs.2 refers to the second observation of the teacher in Case 1). In addition, further columns were added, similarly to those in the interview transcripts:

- Observation reference and timestamp
- Links to research questions, and to aspects of the Funnels of Influence Model
- Relationships to other areas of the transcript (e.g. timestamp of related data)
- Annotation about additional data which was required after the initial analysis (i.e. matters to follow up with later school visits)
- Descriptive coding (e.g. key words or phrases which highlight emerging matters)

An example of this can be seen in Figure 3.7.

Figure 3.7: Observation Vignette example with signposts to aid analysis

Case 3, Observation 2 - Year 6 French Lesson				
Obs. Ref.	**Observation Field Notes**	**Related teacher interview data**	**Insights to Pedagogical Stance**	**Additional Data required**
1.3	The children lined up outside of the classroom and were welcomed in by the teacher standing at the door at the start of the lesson; greeting them each as they came in. Children brought large pencil cases and exercise books with them, and seated themselves in the row-based seating relatively quickly.	I sit them in pretty much alphabetical, I try to do boy girl, boy girl. That's not a school policy that's just what I've always done. (T2-5, 10.31)	Seating - teacher decision made to make their remembering children's names easier. Seating has no connection with learning.	What is the intention behind welcoming children at the door? Teacher-focused or Child-focused?

In columns to the right of the vignette row above, the data was coded as;

Aspect of Funnels of Influence Model			Links to Research Questions	
Arena (school policy to line up outside and to bring own resources)	**Identity** (purpose and messaging within door welcoming)	**Setting** (seating decision, welcome at door)	RQ1b	RQ1c

3.7.5 Visit cycles

The transcription and vignette creation processes took place following each school visit. This meant that additional data requirements could be identified prior to consequent visits, including:

- Gaps in data (e.g. where RQs were not yet sufficiently addressed, or where there was insufficient data from an aspect of the Funnels of Influence model)
- Matters which needed clarification
- Friction within the data, or emerging hypotheses which needed further probing

The first two columns of the transcripts (i.e. transcription of the words spoken by researcher and teacher, including pauses but not including other non-verbal data) were shared with teachers after all visits had been completed (as set out in Section 3.5.4).

3.8 Data Analysis

Once the 23 interview transcripts and 8 observation vignettes had been created another sequence of analysis followed. As described in Section 3.7, the transcript and vignette data were complimented by additional columns which coded and signposted research questions, Funnels of Influence Model aspects, and links between one area of the data and another. Descriptions alongside those codes simplified cross-referencing aspects of the data across each teacher's dataset. The accumulated dataset was therefore straightforward to navigate, and the researcher completely immersed within it.

The next stage was to draw out data relating to each research sub-question. It is the accumulation of analysis from the sub-questions which respond to the overarching RQ1 and RQ2, and it is the combination of RQ1 and RQ2 which respond to RQ3. The analysis for each of these is now described.

3.8.1 Addressing RQ1a

In both the methodology and findings chapters, sections addressing RQ1a appear longer than for other RQs. This is because the RQ1a sections address RQ1a itself as well as unpacking other aspects of the data such as case-specific discourse analysis and findings.

The process for drawing out data pertaining to a teacher's espoused pedagogical stance (RQ1a) was initially a re-reading of interview data which earlier coding had signposted as relevant. Signposted data reflected two kinds of espousal about pedagogical stance. The first was where teachers had responded directly to interview questions asking them about their pedagogical stance. This reflected what the teacher deliberately espoused.

The second was where teachers revealed details about their espoused pedagogical stance whilst responding to other questions. For example, when Teacher 1 was asked to describe a perfect lesson (Figure 3.8), key pedagogical points were drawn out and compared to statements in The Pedagogy Framework (see Section 2.4) in order to identify which model of pedagogy the teacher's espousal most convincingly aligned with. A summary of this can be seen below.

Figure 3.8: Example of espoused pedagogical stance mapping to The Pedagogy Framework

Espoused Data	**Key points**
Oh gosh. Um [long pause, sIgh, sIgh] well defInItely It would have to have technology In It used by the chIldren and not just by the teacher [laughs] that's for sure, so defInItely resources avaIlable for chIldren to use, but Independently that they would access, so there Is a lot of pre learnIng that would have had to have gone on. Erm. [tut] that you wouldn't recognIse who the teacher was. So you would walk Into the classroom and you'd go where where Is the teacher? Oh rIght the teacher Is there. So none of that standIng, now I know they do and we're not there but none of that standIng at the front. But If you really know the chIldren then you can just come In and they're just off, and they know the next steps and they're just off doIng It. That Is a really skIlful teacher beIng able to do that. And then the teacher Is not, not and I don't want to use, facIlItatIng, because It's more than that, It's really scaffoldIng, pushIng those chIldren on, rIght I've looked at what you dId yesterday or In the last week and I know I need to work wIth you FIona because you need a IIttle bIt of help wIth that you're goIng to be fIne and then I'm just goIng to go over here and support them and then beIng really not fluId In a throw It all up In theIr aIr way, but fluId In a just don't know where thIngs are goIng to go, and that's why I thInk the plannIng Is really hard I thInk when the strategIes were Introduced years ago and we got Into the stage dIdn't we of goIng rIght we have got to plan our EnglIsh and Monday Tuesday wednesday we've got to do thIs and dah de dah de dah but there's no room to go actually they dIdn't get It. (T1-1, 24:23)	1 - Technology used by children not 'just' teacher. 2 - children using technology/resources independently. 3 - pre-learning to enable independence. 4 - teacher not 'at the front' but amongst the children. 5 - children know what to do / next steps. 6 - teacher role as facilitating - scaffolding, next steps. 7 - teacher working with individuals / groups that have been identified as needing help based on yesterday's assessment. 8 - responsive teacher actions, responsive planning.
Mapped to TPF descriptors	**How it maps**
"The teacher sees themselves as the authority in scaffolding learning – which may be through activity - towards an understanding of established knowledge claims." (Views of the teacher and teaching, Constructivism)	The teacher sees themselves as the pivot around which the learning activities are organised - with or without them directly involved.
"Teachers methods build upon a learner's prior knowledge and guide or scaffold experiences towards new competencies." (Views of the teacher and teaching, Constructivism)	The teacher is defining what is being learnt and by whom, based on curriculum planning and the previous lesson's assessments.
"Learners are seen as knowledgeable, and that their prior knowledge either dictates future learning, or it is specifically subject knowledge which is valued." (View on learner and learning, Constructivism)	Learners knowledge is seen through assessments. Those assessments direct future learning activites as well as the way in which the teacher engages directly with them during the next lesson.

However, there was a problem which needed addressing in this process because interpreting espoused pedagogical stance was more complex than it would initially appear. Specifically, because what is said is not always what is meant (Hamachek, 1999). This posed a specific problem for RQ1a which looks specifically at what teacher's espouse (say).

Most studies take the spoken word at face value – and that face value becomes the interpretation of what is espoused. However, as detailed in Section 2.3.2 this makes all kinds of assumptions about shared meaning, intent and clarity within the words chosen. That creates a friction with the epistemology of this study. The many features of what discourse analysis calls intertextuality (Tannen et al., 2015) form part of what is espoused (e.g. referencing previously discussed topics, positioning particular views). Thus, for a study which recognises this, the probing of how things are espoused is as important as the literal word.

For example, in the extract shown in Figure 3.8, the response begins with an emphasis on children's independence and critically, positions the teacher non-hierarchically suggesting potential for Sociocultural alignment (see Table 2.6). Yet, later in the same passage there is a shift to focus instead on the role of the teacher, the role of formative assessment and the teacher's actions during the lesson (rather than the actions of the learner). These suggest potential for Constructivist alignment (see Table 2.6). Yet both were part of the same passage of discourse. These kinds of friction within the data needed to be addressed because it affected how the discourse was interpreted and thus how the teacher's espoused data aligned with different models of pedagogy.

Each teacher utilised slightly different discourse features within data generation and so an example is given here as an illustration of how these were approached specifically in relation to RQ1a.

The first example relates to the use of pronouns. In the extract below Teacher 1 was talking about their teaching of a Year 6 class the previous week.

Figure 3.9: Example of pronoun use within discourse data

TImIng	**Teacher**
01:09	In terms of plannIng, and It not being a rIgorous process of everyone doIng the same. **We** do have plannIng that sIts behInd that whIch Is rIgorous such that **we** have an overvIew of where **we're** goIng and what **we** want those chIldren to achIeve. And then In that scaffoldIng meetIng Its almost IIke a storyboard wIII be worked for the week, so that **we** know exactly what's goIng on, who's doIng what, etc etc. So that anybody comIng In to cover or to teach has access to that. It's all on a shared document. **We** do It on Google Docs. WhIch means that If I, let's say that **I** teach the lesson on Monday and some questIons have arIsen, about maybe the chIldren **I** assumed theIr prIor learnIng was at such a poInt and It wasn't so **we** had to scaffold down and then back up agaIn. So **I** can add that to the Google Docs and then everyone can see It and share It. Last week **I** was teachIng a whole class all week up In year 6 because we had someone away. So because **I** was teachIng all week In that class and **I was responsIble** obvIously for theIr currIculum that week, so **we** had the same texts but **I** had a greater depth group who mastered the task that **we** had decIded for greater depth so **I** looked a what **I** could do to support them in gettIng In even deeper, so **I** added that to the Google Doc so that any of the other year 6 groups could also access. So It's kInd of, It's revolutIonIsed it... In the mornIng as teachers **we** can now come In and open up Google Docs and there's everythIng that we need. Because It's all shared.

This area of data was probed in relation to RQ1a because whilst it was discussing the role of Google Docs as a tool to support teacher's planning and preparation it also illuminated the teacher's views on teachers and teaching.

At surface level the focal points within the discourse were compared to The Pedagogy Framework (Table 2.6). The teacher's focus on group planning and pre-identified objectives initially suggested alignment with Behaviourism. However, the highlighting of children's questioning, formative assessment, gaps in prior learning, and responsively extending particular groups of children suggested alignment with Constructivism. The absence of mutuality, reifying experiences, or drawing upon the other identities and

experiences brought by children ruled out Sociocultural alignment. Two further considerations were therefore necessary – one to compare those hypotheses with others across the dataset in order to ascertain pedagogical model alignment, but first, importantly, to consider any anomalies between what the teacher said (interpreted at surface level) and what meaning was conveyed (interpreted through discourse analysis). Both considerations were necessary in order to draw a conclusion about what their espoused pedagogical stance may be (RQ1a).

In the extract above the bold text reflects how the teacher used the different pronouns ‘we’ and ‘I’. The use of pronouns was consistent with the subject matter that was being described in each section of the narrative (i.e. the planning process). The pronoun ‘we’ referred to the Year 6 teachers’ actions and ‘I’ referred to the individual teacher’s actions. A difference can be seen in which aspects are referred to as ‘we’ (collectively agreed processes) and which are referred to as ‘I’ (individual actions); the latter being much more responsive to the arising needs of children.

Attention to these discourse features – and their implications - enables a more robust consideration across the dataset. Discourse Framing theory (Nelson, Oxley and Clawson, 1997), would suggest this to be surfacing friction within the teacher’s identities which becomes an important part of interpreting what the teacher means. Framing theory sets out that a speaker positions themselves – including through the use of pronouns - in order create a frame on a situation through which the audience is directed (ibid).

The (probably subconscious) use of framing by the teacher in the example above suggested a more likely alignment with Constructivism (rather than Behaviourism which may have continued to frame the individual actions through process, or Socioculturalism which may have inferred lesser alignment with group planning processes).

It was then important to compare those kinds of findings across the dataset within each case. For example, when the teacher spoke elsewhere about aspects of pedagogy their use of pronouns expanded to include ‘you’, ‘I’, ‘we’, ‘yourself’ and ‘my’. The teacher’s use of framing can be seen in the extract seen below where they are using ‘you’, ‘I’, ‘we’, ‘yourself’, and ‘my’, all within the same description as they navigate around their explanation.

Figure 3.10: Example of multiple pronoun use within discourse data

TImIng	Teacher
T1-1d	
04:14	Absolutely. Because everythIng **you** do is about assessment for learnIng, and so the dIrectIon **I** might take might be slightly dIfferent from the teacher in the next door class because the needs of those children might be slightly dIfferent. And in havIng the working walls as **we** do – because there is an expectatIon those rooms that have the working walls, as in the write on walls – the expectation is that they wIll be used by **yourself** and the chIldren durIng the course of the week, and that is a growIng process. So consequently **my** room mIght look dIfferent to the room next door because the questions **I've** asked and the answers **I've** got back and the thinking the children do might be slightly different.

The context of the teacher's narrative needed to be born in mind in order to draw out what they meant in their espousal. For example, the teacher spoke about themselves as 'I' when referring to the actions they undertook when they viewed their identity as 'a teacher'. When they responded with 'you' they were using a strategy known in discourse analysis as Centering Theory (Walker, Joshi and Prince, 1998). This theory says that a speaker changes the use of pronouns to adjust where the audience centres their attention. In this example, the teacher may be using the word 'you' to refer to conventional wisdom rather than their specific audience (Wilson, 1990, p.57). The literature seems to indicate that this is done to align with an audience; inferring a shared sense of agreement about a matter or disagreement with conventional wisdom rather than an implicit belief. Similarly, the teacher then used 'we' not to refer to those present (the researcher and teacher), but, drew upon their identity as a member of the school's teaching community inferring expectations rather than implicit beliefs.

Centering theory (Walker, Joshi and Prince, 1998) would suggest the way in which this teacher switched between pronouns indicated multiple identities (within single passages of discourse), some of which suggested implicit beliefs whilst others suggested behavioural alignment with perceived expectations from others. Therefore, when interpreting the content of the teacher's discourse, this needs to be considered in order to ascertain whether their words convey what they think or believe, of whether they are being spoken because of another influencing factor. For example, what the teacher:

- has been trained to espouse through professional training
- has learned to espouse through accountability systems
- wants to espouse in order to conform with what they believe is their ideology
- wants to espouse in order to align with colleagues
- wants to espouse in order to align with the researcher
- wants to espouse in order to align with perceived research focus
- espouses unintentionally through use of vocabulary or examples
- espouses unintentionally through means of contradictions

Data extracts from across the teacher's full dataset therefore become vital to consider. For example, what may be influencing what the teacher set out about assessment and thus how their espousal conceives and frames assessment. To exemplify the discourse features introduced above, it is helpful to return to the same extract (Figure 3.10). It is possible to see that the teacher is making a distinction between features of the pedagogy that they describe. For example, when they use the pronouns 'I' or 'my', they focus on their responsiveness to the specific children that they are working with (suggesting Sociocultural or Constructivism). Whereas when they use the pronouns 'we' or 'you', the focus is on collective approaches (e.g. informed by collective agreement, policy or expectations – such as the working walls). Whilst one might argue that this is just a reflection of who is participating in a particular action (e.g. the use of 'we' conveying a group action and 'I' an individual one) it is unlikely to be that simple. This is because Framing theory suggests pronoun use of this nature reflects subconscious alignment with an action (Nelson, Oxley and Clawson, 1997). In other words, the teacher may be choosing to use 'I' when talking about individual needs of children in their class rather than 'we' because they perceive that other teachers are not addressing this in the same way (reflecting their identity within the school Arena). Furthermore, they may be using 'we' rather than 'I' when referring to the working walls because they see themselves as aligning with consistent expectations across the school rather than using them differently to colleagues (additionally reflecting school Arena Opportunities and Possibilities). This surfaces the possibility that whilst at face-value the teacher is setting out a particular pedagogical stance, the way in which they espouse it may distinguish between what they implicitly believe, and what they espouse as a result of adoption or conforming. Thus, comparisons between areas of the data – using the Funnels of Influence model to surface the relevant influences upon them - are absolutely vital in order to surface what the teacher is actually saying as opposed to what they are surfacing. Those distinctions can then be explored by comparing one area of the data with data across the wider dataset.

Through the example outlined above, the approach for addressing RQ1a has been illustrated. In summary this was:

- reviewing data that had been signposted by earlier coding
- unpacking signposted data by looking specifically for influences affecting it (directed by the data coded to signpost different aspects of the Funnels of Influence Model – Figure 2.6)
- considering how those influences relate across the teacher's dataset to reveal underlying influences shaping the teacher's discourse and espoused pedagogical stance

- comparing teacher's espoused data to models of pedagogy (in The Pedagogical Framework – Table 2.6) to form an initial hypothesis about possible alignment with Behaviourist, Constructivist or Sociocultural models
- reviewing the teacher's dataset to search for alignment or friction with that hypothesis
- probing the use of discourse features within relevant areas of data to surface possible frictions
- comparing areas of data to other areas of data in light of those possible frictions
- drawing out the most likely pedagogical model alignment (using The Pedagogical Framework) based on the above

It is important to note that this was not a linear approach but required continual revisiting of areas of data. As illustrated above, probing one area of data to test a hypothesis often surfaced other hypotheses which then also needed investigating.

However, what this process did produce was an interpretation of which TPF model of pedagogy each teacher's espousal (RQ1a) most aligned with, along with an accompanying narrative about why that was felt to be the case. These are seen in detail in Chapter 4.

3.8.2 Addressing RQ1b

RQ1b asks what the teacher's intended pedagogical stance is. It is important to be explicit about the differences between espoused views (I think that…) as opposed to broad intentions (I am going to… /I will…). Depending on literal interpretation of words within the transcripts the phrasing can make this difficult. For example, teachers used 'I think', 'I feel', 'I would' and 'They can' which could be interpreted as either espoused views or intended practices. However, discourse features help clarify. For example, the use of dialogic overtones - where the speaker chooses to expand or omit information based on what they know that the audience has already heard from them within the same passage of speech - connect and contextualise aspects of data. This is illustrated through the examples seen below.

Analysis of data concerned with RQ1b (the teacher's intended pedagogical stance) focused on two aspects of interview data; broad intentions, and specific intentions. This was because different influences will have affected them. The Funnels of Influence Model being used in earlier signposting enabled the researcher to identify and then prioritise and consider such influences in order to inform more trustworthy interpretation. Specific intentions were typically influenced by features of the school Arena and classroom Setting, whereas broader intentions were typically more aspirational – stemming from a teacher's Funds of Identity.

Specific intentions were where teachers highlighted tangible actions that they intended to enact. This data was drawn from the interview data that was gathered immediately prior to, and focused on, observations. An example can be seen in Figure 3.11 below in the second column on the left side. In that example the specific intentions relate to the use of an iPad to record a group working independently in order for the teacher to review their dialogue after the lesson as means to prepare appropriate activities for them for the following lesson. The intention behind that approach was to enable that specific group of children to get straight on with their learning rather than wait for the rest of the class, and to enable the teacher to provide more targeted direct teaching for the other children in the class. As illustrated in Figure 3.11, the key points were then aligned with models of pedagogy using The Pedagogy Framework (Table 2.6) – similarly to the process in RQ1a.

Figure 3.11: Example of aligning a specific intention with TPF descriptors

Specific Intention	**Key points**
In terms of what… the kit that you can see in here… there's an iPad here that is going to be recording what is happening in this group… and the reason it's going to be recording what's happening in that group is because I know they're at a certain point in their learning and actually from the minute I've introduced what we're doing today they can get on with Construct 2... The rest of them are going to need some input to Construct 1. They're going to need some real Direct Teaching before they can begin. So it means that that group [gesturing to iPad setup area] can get straight into their learning and pushing on whilst the rest of them have me as their focus (T1-2, 0.05)	1 - Recording target group (for teacher to later review) whilst they get on with next step. 2 - Rest of class still require Direct Teaching input on previous step.
Mapped TPF descriptors	**How it maps**
"Learners are seen as knowledgeable, and that their prior knolwedge either dictates future learning, or it is specifically subject knolwedge which is valued" (View on learner and learning, Constructivism)	Learners knowledge is seen through assessments. Those assessments direct future learning activities as well as the way in which the teacher engages with them during the next lesson
"The teacher sees themselves as the authority in scaffolding learning - which may be through activity - towards an understanding of established knowledge claims" (View of the teacher and teaching, Constructivism)	The teacher sees themselves as the pivot around which the learning activities are organised - with or without them directly involved.
"Teachers methods build upon a learner's prior knolwedge and guide or scaffold experiences towards new competencies" (View of the teacher and teaching, Constructivism). "Teachers may: guide learning, eliciting prior knolwedge and model knowledge towards specified curriculum goaps with contingent guidance. IOr, they may direct learning through the zone of proximal development - scaffolding and using dialogue" (Views of the teacher and teaching, Constructivism)	The teacher is defining what is being learnt and by whom, based on curriculum planning and the previous lesson's assessments.

Broad intentions were where teachers were aspiring or planning to enact something less immediate or concrete. For example:

Figure 3.12: Example of broad intentions within discourse

Timing	Teacher	Researcher
0.19	Um… I *love* using technology because I think it has a lot of potential to encourage… I think children love technology generally… there are a lot of talk about what they got up to at the weekend, about playing on their X-Box, um… there's not much going on outside... they are generally... that's a huge sweeping statement, but especially at this school there was, they do love technology... they can work out how to use an iPad before they can write their name, so [sigh] I feel like trying to battle that... obviously I would... I'm not saying I would use tech over anything else, I would take them outside to do a welly walk if we wanted to write a description about the forest or something, but... if I'm trying to get them as I mentioned earlier to write about Iceland, then why not use what technology has to ... um... to bring them to Iceland? They can put on headsets [mimes doing so] and they can look around and I just think it's so exciting, and um... it's like... it's playing, it's make believe... we put them on the plane by sitting down and acting as the air hostess [hand gestures] having a huge you know the interactive whiteboard showing a video of going up through the... and I just think that makes it exciting and they can buy into it and play a little bit...	

In this example, the broad intention can be summarised as utilising technology to extend learning where there were clear benefits to doing so. However, when looking for alignment between the intention and a model of pedagogy it is more problematic because of the rationale behind each intention. Rationale behind intentions necessitated probing of the wider dataset, drawing together ideas spoken about elsewhere. The Funnels of Influence both informed that data being generated, as well as then enabling signposting to relevant data at this stage of analysis. For example, in the extract above, whilst technology was seen to motivate children to engage, it was because it offered experiences beyond those already accessible to the children (e.g. seeing what a place looked like in Iceland through a VR headset). For the purposes of interpretation, the rationale behind that broad intention might be viewed as a combination of:

- pre-defined ideas about the learning intentions (writing about Iceland) – which could align with Behaviourism or Constructivism depending on the specificity of intentions for the group versus individual children within that group
- using children's previous knowledge and experiences (or lack of) to inform planning about the starting point for that learning being the learners rather than the subject – which could align with Constructivism or Socioculturalism depending on why Iceland had been specifically chosen (e.g. how that topic related to those specific children)
- giving children access to previously inaccessible experiences - which could align with Behaviourism (if experiences were pre-conceived as necessary to that group), Constructivism (if considered as part of specific children's zone of proximal development), or Sociocultural (if conceived as addressing children's broader identities and communities)

In the example above the teacher had already spoken about the impact of disadvantage on children in this group and how their limited experiences of the world beyond the immediate locality affected their ability to access some learning Opportunities. Furthermore, that the activities referred to in the example (e.g. plane journeys, Iceland) stemmed from interests prompted by the small group of children. In addition to which, the teacher themselves had spoken about their own childhood experiences of a teacher opening up previously inaccessible Opportunities and the impact that had on their own learning both at the time and ever since. As such, the broader intention is far more closely aligned to pedagogical approaches where the teacher is drawing together Opportunities, subject matter, tools and experiences grounded in children's identities. This is an important demonstration of the danger of taking literal meaning from words, or fragmenting data by removing it from its chronology. Those dialogic overtones would not be understood without the accumulation of all previous data (both spoken and unspoken).

Whilst the data itself must not be fragmented or interpreted without an accumulation of what preceded it, collations of signposts enable the researcher to quickly return to the most relevant parts of the dataset. To this end, transcripts and vignettes were trawled to surface both specific and broad intentions and signposts to these were pasted into a table (see Figure 3.13). The third column lists a descriptive summary (not verbatim quote) of the broad or specific intention.

Figure 3.13: Extract from the list of broad and specific intended practices from Case 1

Interview Reference	Time Stamp	Intended Practice (Broad and Specific)	Categorised into themes
T1-1a	0..42	To work more efficiently.	Efficient ways of working
T1-1a	2..34	To use technology in a way that makes a difference to learning.	Increase impact of teaching
T1-1a	3..12	To make resources available to others anytime/anywhere.	Facilitator of learning for others
T1-1a	4..42	To use technology to improve feedback - specifically making the feedback process more efficient and effective.	Increase impact of teaching
T1-1b	0..26	To use out-of-school time to plan, prepare and follow up learning opportunities.	Increase impact of teaching

In order to draw overarching meaning from a long list of broad and intended practices, the summaries used descriptive phrases. These were not pre-determined but drew out key features based upon the dialogic overtones within the data (e.g. increasing teacher capacity through use of instructional videos, T1-2a, 8.06). Those phrases were then compared to each other using a form of Constant Comparative Method (Glaser and Strauss, 1967) in cycles until a list emerged which gave an overarching summary of the range of teacher intentions. For example, Teacher 1 spoke about the use of QR codes:

Figure 3.14: Example of Teacher 1 describing QR code use

Timing	Teacher
11:06	Now, the QR code I've got on the wall there [gestures to wall]. Now the videos have got QR codes linked to them… which means that if you were struggling with construct 1 today, let's say you were really struggling with that one [gestures to it], then… what you could do as a child, when you think oh no I've really not got it and you've got your partner and your partner isn't been any help you could go over there, you could grab the QR code, we've got QR readers on the erm, laptops, they could literally put it against there and then sit and watch whatever it is.

This was then categorised as follows:

Figure 3:15: Summary of intention within specific practice

Interview Reference	Time Stamp	Intended Practice (Broad and Specific)
T1-2a	11..06	To enable children to access online support resources through QR codes as part of classrom teaching / resourcing.

It was then grouped with other similar intentions into a summary as seen in Figure 3.16. (The example above forms part of the first category in the summary below).

Figure 3:16: Grouping of intended practices within Case 1 dataset

Category	Summary of Intention	Examples of this Intention within dataset
1	The teacher making resources or opportunities more accessible in order to make additional learning achievable.	(e.g. T1-1d, 18:43, T1-2a, 11:06, T1-3a, 11:02)
2	Teacher actions that enable children to learn more effectively	(e.g. T1-1b, 19:32, T1-1d, 18:43, 21:05, T1-2a, 12:57, T1-3a,
3	Teacher actions that address specific needs of those being taught	(e.g. T1-1b, 19:32, T1-2a, 29:07)
4	The teacher finding more efficient ways of working	(e.g. T1-1a, 0:42)
5	The teacher carrying out actions with the intention of increasing the impact of teaching	(e.g. T1-1a, 2:34, T1-1b, 3:04, T1-1d, 18:43, T1-2a, 5:39)
6	The teacher amending actions to free up teacher capacity in order to use teacher time more impactfully	(e.g. T1-2a, 8:06, 14:03, T1-3a, 9:38)
7	The teacher's self-identified role as a facilitator of learning for others	(e.g. T1-1a, 3:12, T1-1b, 2:18, 13:46, 29:49, 32:46, T1-1d, 6:26)
8	The teacher's high levels of reflection on action and reflection in action	(e.g. T1-1b, 5:19, 30:07, T1-3a, 21:54)
9	The teacher conforming to local or national policy expectations	(e.g. T1-1b, 10:34)
10	The teacher displaying an outcomes based mindset	(e.g. T1-1a, 1:02, T1-1b, 27:11)
11	The teacher reacting to their own experiences of teachers from childhood	(e.g. T1-1b, 19:06, 26:14, 29:15, T1-2a, 26:58, T1-3a, 10:20)
12	The teacher's fear of not being 'left behind' by other colleagues (keeping up with 'the latest' ideas and innovations)	(e.g. T1-1a, 2:43, T1-1b, 1:53)

The groups of intentions were then mapped to The Pedagogy Framework (Table 2.6) as illustrated in Figure 3.17.

Figure 3.17: Mapping of RQ1b intended practice group to TPF descriptors

Category	Summary of Intention	Examples of this Intention within dataset
1	The teacher making resources or opportunities more accessible in order to make additional learning achievable.	(e.g. T1-2a, 11:06) To enable children to access online support resources through QR codes as part of classrom teaching / resourcing.
	Mapped to TPF descriptors	**How it maps**
	“Teachers are the authority in scaffolding learning to achieve established knowledge claims”. (Views of the teacher and teaching, Constructivism)	The teacher is defining 'what' the resources are (the teacher made YouTube films with teacher defined knowledge within them)
	“Knowledge is abstracted and available for transfer across situations” (Views of knowledge, Constructivism)	The YouTube films are 'the knowledge' and utilised by all children (not differentiated), and by support staff for training and consistency across teaching. (Refers to Interview data about other purposes of these films - T1-2a, 29:07)

This process reflected an emerging alignment between the intentions within teachers practices and a model of pedagogy which then became the response to RQ1b.

3.8.3 Addressing RQ1c

Analysis of data concerned with RQ1c (the teacher’s enacted pedagogical stance) looked primarily at observed practices and the interview data that contextualised them. However, analysis for RQ1c also considered wider data about enacted practices that surfaced possible alignment or contradiction between such practices and earlier espousals and intentions. The Funnels of Influence Model aided both processes in directing attention during data generation (see Appendix I for observation guide) as well as then enabling effective signposting of relevant data during consequent analysis.

The first stage of RQ1c analysis was to re-review all observation vignettes for the case, and to draw out common traits. An example of this can be seen in the summary below which reflects key pedagogical features which were common across all observations for Teacher 1 (Note: RQ2 discusses the uses of ICT within observations in detail, so those are not addressed explicitly in RQ1c here). Interpretation of these features was influenced by prior data generated during discourse with the teacher. For example, in the 2nd row of Table 3.7 reference is made to write-on walls which data elsewhere surfaced as a school arena expectation rather than individual teacher decision. Whereas, the 3rd row in the table makes reference to the deliberate nature of the teacher’s language which data elsewhere identified as a direct result of their individual prior experience responding to app-generated analytics about their use of language during teaching. In both cases the influences that created those actions affected the prominence that those features were then assigned in the summary of their observed practice. The next stage of this analysis process was then to map these rows to The Pedagogical Framework descriptors which can be seen in the see far-right column of Table 3.7.

Table 3.7: Mapping of observed features of teachers practice with TPF descriptors

Focus area	Features across observations	Mapping to The Pedagogy Framework
Inputs	These explained how the observed lesson built upon previous learning, how the new learning could be applied to a range of contexts – drawing on other areas of previous or current learning (e.g. topics), and how it would later be built upon through future learning (Obs.1, 1.6, Obs. 2, 1.2, Obs. 3, 1.22);	"Teachers are the authority in scaffolding learning to achieve established knowledge claims" (**Constructivist, Views of teachers and teaching**). "Knowledge is constructed it doesn't represent an objective external reality" (**Constructivist, Views of knowledge**)
Activities	These were varied; combining practical activities requiring the children to move around the classroom, use write-on walls (Obs. 1, 1.11), undertake practical application of ideas, opportunities to practice ideas before committing to books or answer sheets (Obs. 1, 1.6), and involved resources which enabled children to be more independent (Obs.1, 1.13, Obs. 2, 1.2, 1.9), or allowed for differentiation within the class (Obs. 3, 1.24);	"Younger children need concrete experiences older children can begin to abstract and create models grounded in practical problem-solving activity" (**Constructivist, Views on learners and learning**)
Language	The teacher language was very deliberate; with speech gentle and purposeful (Obs.2, 1.15). The teacher used precise vocabulary to give feedback to children (Obs.1, 1.6, 1.8, Obs.2, 1.6, 1.10), descriptive praise, clear instruction (Obs. 2, 1.11), warm encouragement and firm expectations (Obs. 2, 1.2, Obs.3, 1.21);	
Links	The teacher adapted explanations and activities very subtly to meet the needs of children during the lessons (Obs.1, 1.6, Obs.2, 1.4); and was discrete about interventions so that children appeared to maintain dignity even when struggling with tasks or ideas (Obs.3, 1.25);	"Teachers elicit children's prior knowledge and model learners' knowledge through process of testing and retesting. They provide contingent guidance moving individual learning towards specified curriculum goals." (**Constructivist, Views of teachers and teaching**)
Relationships	The teacher used a range of ways to encourage different types of collaboration; through small groups working independently of the teacher (Obs. 1, T1-2a, 2:40) and seating children in changing pairs so that discourse focused on learning rather than social (Obs. 3).	"Learning occurs in dialogue with others in activity. It is through dialogue that meanings emerge between people." (**Constructivist, Views of learner and learning**)

In the example seen above the mapping suggested a teacher's observed enacted practices aligned with constructivism. It was then important to re-review the data to search for any contradictions. These are detailed through narrative within the findings of each case in Chapter 4.

3.8.4 Responding to RQ1

Once analysis had been completed for RQ1a-c it became possible to draw out the teacher's overarching pedagogical stance. This was achieved by considering the influences that had affected the espoused, intended and enacted, and the extent to which they shaped what the teacher said and did – revisiting the processes set out in Sections 3.8.1-3.8.3 above. The extent to which the influences affected the teachers discourse and actions was addressed by returning to the data that signposted each aspect of the Funnels of Influence Model and considering how the teacher spoke about those influences – as exemplified in Section 3.8.1. The relative importance of pedagogical approaches surfaced by the teacher could then be interpreted, drawing out those that appeared to be the most embedded in their discourse and actions – their implicit pedagogical stance. For each teacher this stance was then aligned with a model of pedagogy using The Pedagogical Framework, with features particularly prominent within the data highlighted through a narrative explanation within the findings of each case in Chapter 4.

3.8.5 Addressing RQ2a

RQ2a asks what a teacher's practice reveals about their uses of ICT (RQ2a).

The first stage of analysis reviewed the observation vignettes for each case to draw out the uses of ICT within observed enacted practice. Figure 3.18 illustrates an example of this. Each use of ICT is summarised alongside a corresponding timestamp and vignette reference in order to signpost it within the dataset. The summaries seen in the third column describe actions (e.g. Use of SeeSaw to enable a small group to set off on a task independently from the teacher; T1, Obs. 1, 1.7). The fourth column summarises the ICT use through a brief description which then became a descriptive category, which enable later broad comparison to other ICT uses within the case. The final column related interview data.

Figure 3.18: List of signposts to the uses of ICT in observed teaching practices in Case 1

Obs.	Obs. Ref.	Use of ICT in observed enacted teaching practice	Category	Related interview data
1	1.7	Use of See Saw and then iPad and Iris - to enable a small group to set off on a task independently from the teacher.	Making additional resources and opportunities available	"the kit that you can see in here… there's an iPad here that is going to be recording what is happening in this group… And the reason it's going to be recording what's happening in that group is because I know they're at a certain point in their learning and actually from the minute I've introduced what we're doing today they can get on with Construct 2… The rest of them are going to need some input to Construct 1. They're going to need some some real Direct Teaching before they can begin. So it means that that group [gesturing to iPad setup area] can get straight into their learning and pushing on whilst the rest of them have me as their focus." (T1-2a, 0.05)
1	1.8	Use of iPad and IRIS - to enable teacher to listen back to children's dialogue, better understanding their learning, and better plan the next lesson	Enabling more precise feedback	"So the ipad here is a piece of kit that I use called Iris, which you know about, you're familiar with and sometimes I'm using it is to capture what is going on for a particular group that I can't be focused on at a particular time. So I want to hear their conversations afterwards, so later on this evening I will play it back and listen to what their language was like, what they were saying and what connections they were making which will enable me to do something tomorrow that will move them to the next step. So that's how that works." (T1-2a, 2.25)

Following this, the categories (seen in the fourth column of Figure 3.18) were listed separately and grouped until a pattern emerged about the nature of ICT use within the teacher's practices. This process can be seen in Figure 3.19 (Note: bold is used to highlight key data or overarching points).

Figure 3.19: Themes emerging from within Case 1 ICT occurrences

Example of use of ICT in observed enacted teaching practice	Emerging categories (from multiple examples)	Grouped categories (from multiple emerging categories)	Overarching trends surfaced within the teacher's uses of ICT
Use of See Saw and then iPad and Iris **to enable a small group to set off on a task independently from the teacher**. (Obs. 1, 1.7)	making **additional teaching resources** available (e.g. See Saw, iPad, Iris supporting independent groups through instruction and feedback, **Obs 1: 1.7**, 2: 1)	ICT use creating **additional teacher resources that children access independently of the teacher** (e.g. See Saw, iPad, Iris supporting independent groups through instruction and feedback, Obs 1: 1.7, 1.13, 2: 1,1, 1.3)	ICT use created **additional teacher capacity** resulting in opportunity to **redirect time and expertise / more precisely target teaching**
Use of iPad and IRIS - **to enable teacher to listen back to children's dialogue, better understanding their learning, and better planning for the next lesson**. (Obs. 1, 1.8)	enabling **more precise feedback** (e.g. SeeSaw group feedback, next task instructions and Iris listen back to children's dialogue, **Obs 1: 1.8**, 1.9)	ICT enabling **more precision for children's next steps through video feedback and instruction** (e.g. SeeSaw group feedback, next task instructions and Iris listen back to children's dialogue, Obs 1: 1.8, 1.9)	

The trends within the teacher's uses of ICT that emerged from this process could then be probed for what they might reveal (RQ2a). For example, the ICT uses above suggest a focus primarily on teaching rather than learning. It is important to reiterate that the grouping is based on a sequence of data; the original experience of observation, the reviewed recordings of that observation, the transcription and immersion process, the signposting within data, and only then, based on those dialogic overtones the descriptive categorisation and grouping of those categories. This is particularly important because these dialogic overtones alert the researcher to the influences behind individual teacher actions within the observations; and enable subtle distinctions to be made between practices that on the surface appear similar. The dialogic overtones were interpreted by both re-reading prior data accumulated, as well as returning specifically to data signposted to the Funnels of Influence Model aspects that appeared to be influencing the teacher's actions. The detail within such probing becomes very case specific and therefore is set out within each case's findings in Chapter 4.

3.8.6 Addressing RQ2b

The focus of RQ2b was to surface what the teacher said about using ICT in their teaching practice more broadly than their observed enacted practices. To achieve this all further occurrences of ICT within the full case dataset (beyond those in RQ2a) were identified through a careful review of the full case dataset. Figure 3.20 illustrates the summary data with its signposting back to the transcripts and vignettes.

Figure 3.20: List of signposts to ICT occurrences within interview data of Case 1

ICT use present in interview data (summary)	Summary of ICT use	Raw interview data
Describing perceived impact of use of videos - that children can rewatch teacher explanations; 'you can't re-wind a teacher or pause a teacher' but you can with video technology.	Reflection - Teacher Made You Tube Videos / Feedback from Children	And the other thing about it but that you can't do with a teacher – you can't rewind a teacher or pause a teacher [smiles and laughs], but you can with video technology so consequently if they're part the way through something and think oh I just need to go back and hear that again, they can do that, whereas with a teacher… you don't get that til the teacher stops talking, and they say I didn't get the bit when you said, but the teacher can't remember what they said, and it becomes difficult, so I think from that point of view it's really helpful. Um… But does require a level of independence. (T1-1a, 12.57) - "Rewind" comment refers back to teacher quoting child's description (T1-1d, 6.58)
Use of ScreenCast to make short videos to support learning. Originally using iPad and tripod and filming self, then through self consciousness changed to focusing visuals on screen/IWB/paper with teacher audio.	Use of ScreenCast - to make teacher-made videos supporting learning.	I use ScreenCast which is a free piece of software, so I use that a lot. I started using the IPad, so I would set it up on the tripod and would film myself writing onto the screen, and I was so self conscious about doing that, because I thought I really don't if I want want me in someone's living room. Whereas Screencast anonymises me, so you can hear my voice but you don't see me. Which I also think is less distracting for the children because they can actually see the whole screen, whereas if you're standing infront of it or to the side of it they can still see you when you're part of the shot, so Screencast is my absolute way forward. (T1-1a, 3:39)

It is important to note that extracting data in this way brings a risk of fracturing data from its original context as previously discussed. The interpretation therefore is not of the data within the extract itself, but dependent upon the preceding accumulated data - the list just acts as a signpost to aid navigation back to raw data for re-reviewing and consideration. The Funnels of Influence Model is what enables a more robust interpretation of what the teacher meant through their discourse about ICT. For example, in the last column of row

one in Figure 3.20, the teacher talks about 're-winding the teacher'. This refers back to previous discourse where the teacher cited a child using that specific phrase. But, vitally, it also relates to data in a previous interview where the teacher spoke about a teacher in their own childhood who gave brief instruction and then was often not available to the class – and the frustration felt by Teacher 1 in having to undertake given tasks without an opportunity to repeat or revisiting the instruction. Thus, this teacher's drawing out the perceived benefit of teacher instruction videos within current practice goes deeper than a comment by a child – it relates to their own Growth experiences – potentially strengthening the importance placed upon this kind of practice and most probably reinforcing their view of this as beneficial practice.

Similarly to RQ2a, the categories (seen in the second column of Figure 3.20) were listed and grouped until a pattern emerged about the nature of ICT use within the teacher's espousal. This process can be seen in Figure 3.21.

Figure 3.21: Themes emerging from within Case 1 interview data

Data source	Emerging categories	Grouped categories	Trends surfaced
Interview	were not present when the teacher started their career;	reflection on how others relate to ICT differently	reflection on how others relate to ICT differently
Interview	had created a dependency in other teaching staff;	reflection on how others relate to ICT differently	
Interview	were perceived (by the teacher) as being more familiar to younger staff;	reflection on how others relate to ICT differently	
Interview	require a different way of working that is dependent on teacher organisation, security, self-confidence, ability to release control and trust in the children;	reflection on how others relate to ICT differently	
Interview	demand that the purpose of their use is clear in order to make an impact on learning;	reflection on the role of digital technology in education	reflection on the role of digital technology in education
Interview	are one of the many tools available to teachers and learners;	reflection on the role of digital technology in education	

The trends within the teacher's espousal about ICT that emerged from this process could then be probed for what they might reveal (RQ2b). Furthermore, the collation of signposts enabled straightforward navigation so that the researcher could return to the transcripts and revisit what the teacher said about uses of ICT in their wider teaching practice and importantly – guided by the Funnels of Influence - to wider contextual data leading to that narrative. The detail of this differed for each case and so is discussed within the findings for each case in Chapter 4. However, for each case, the data was probed to find out what influenced the teacher's uses of ICT in their teaching practices, and also what influenced what the teacher did not use in their teaching practices.

3.8.7 Responding to RQ2

RQ2 asks how the teacher uses ICT in their teaching. Through the processes above, analysis had drawn out what ICT the teacher used, how they used it and why they were using it in that way. Importantly, it had also drawn out where they had not used ICT and why. The probing into what they had not used was pragmatically bounded by ICT that they were aware of or, as highlighted by school Arena data (generated as a result of the Funnels of Influence Model), that they had access to use. Matters seen to influence teacher's uses (including non-uses) were surfaced descriptively as part of this process. For each case this enabled the surfacing of different features – such as teacher agency and identity in decision making, the ways in which they responded to expectations (e.g. from school leadership, culturally, from children) and prior experiences, and practical matters (e.g. their confidence and competence with ICT). These findings are described specific to each case in Chapter 4.

3.8.8 Responding to RQ3

RQ3 asks; what is the relationship between the teacher's pedagogical stance and ICT use in their teaching practice? This question is dependent on the responses to RQ1 and RQ2. Relationships of any kind are rarely a simple mapping of two things (in this case pedagogical stance and ICT uses), but a broader tapestry of pre-existing influences coming together (see Section 2.4). Before responding to RQ3 there was one further analysis process which utilised the available data to illuminate any relevant matters not already uncovered. The Funnels of Influence model (introduced in Section 2.4) was used during data generation to ensure coverage of data which was known to be relevant to this study. It was also used during data analysis to summarise features specific to each individual teacher within the available data. This took place in parallel to the analysis of RQ1 and RQ2 and refined throughout, so informed each stage of the analysis.

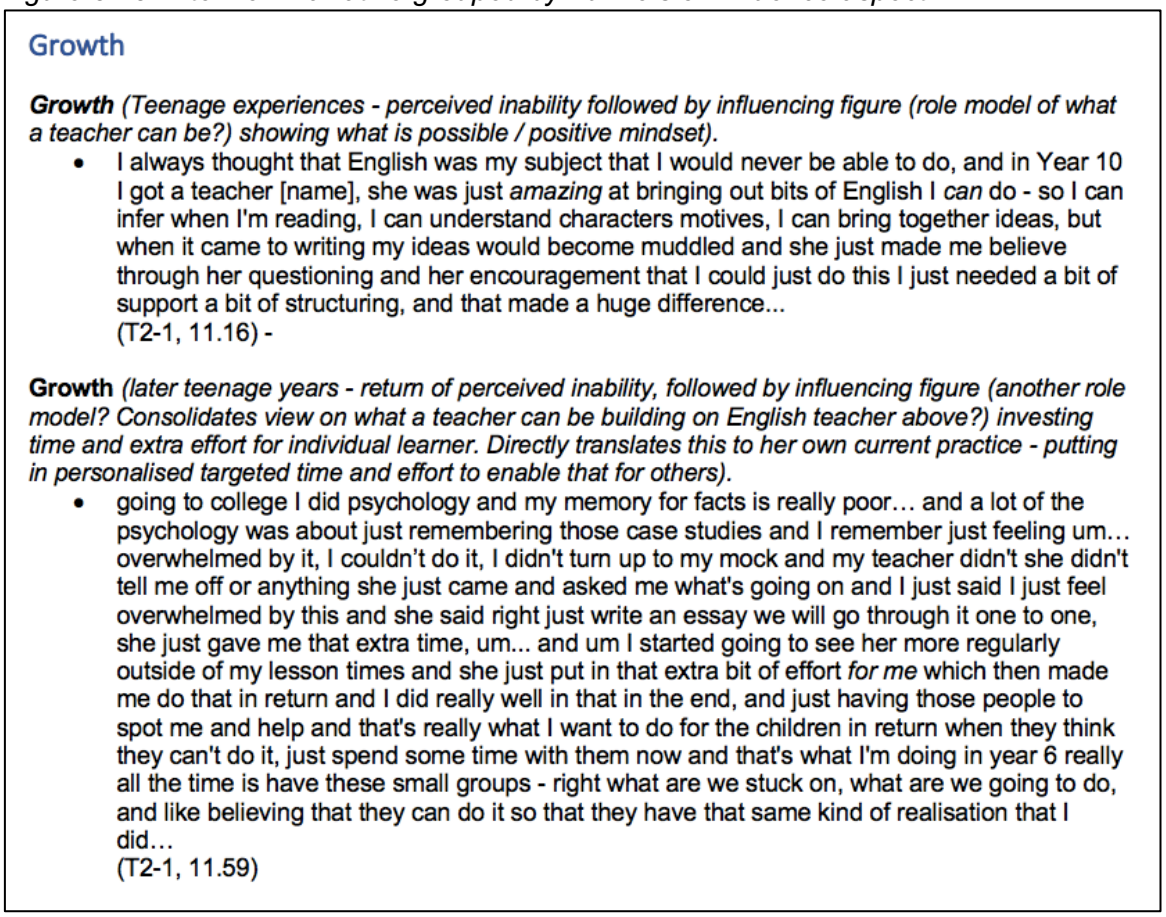
As outlined in Section 3.7 above, transcripts and vignettes had a column which signposted data to one or more aspects of the Funnels of Influence model. This can be seen in Figure 3.22 in columns 7-9.

Figure 3.22: Example of signposting aspects of the Funnels of Influence model from transcript data

INT 3-1	**Transcription of words used by the researcher and interviewee, and an indication of pauses and emphases within speech.**		**Non-verbal and implications; eye-contact, body language**	**Links to specific research questions**	**Links to the Funnels of Influence**		
Timing	**Teacher**	**Researcher**					
11.09	[nodding, answers more immediately than previous questions] yes… so I'm dyslexic, I found English really hard.		nodding continues, then looks straight at researcher whilst		**Roots** (dyslexia - framed as oppositional to 'intelligent brothers' with implication about perceptions of lesser intelligence)		
11.11	My two older brothers are both very very intelligent and I always saw myself as not as academically able as them.		Looks straight at researcher / direct eye contact				
11.16	I always thought that English was my subject that I would never be able to do, and in Year 10 I got a teacher [name], she was just *amazing* at bringing out bits of English I *can* do - so I can infer when I'm reading, I can understand characters motives, I can bring together ideas, but when it came to writing my ideas would become muddled and she just made me believe through her questionning and her encouragement that I could just do this I just needed a bit of support a bit of structuring, and that made a huge difference...		Initially looks down (sad?), then when talking about the English teacher looks up and brighter - firm gestures with hands during exemplification of ideas/examples.	**RQ1** (insights into pedagogical stance - phrasing and ways of seeing the role of teacher and learner)		**Growth** (teenage experiences - perceived inability followed by influencing figure (role model of what a teacher can be?) showing what *is* possible / positive	**Identity** (role of self, relationship with teacher), **Agency** (in learning scenario)
11.59	going to college I did psychology and my memory for facts is really poor… and a lot of the psychology was about just remembering those case studies and I remember just feeling um… overwhelmed by it, I couldn't do it, I didn't turn up to my mock and my teacher didn't she didn't tell me off or anything she just came and asked me what's going on and I just said I just feel overwhelmed by this and she said right just write an essay we will go through it one to one, she just gave me that extra time, um... and um I started going to see her more reguarly outside of my lesson times and she just put in that extra bit of effort *for me* which then made me do that in return and I did really well in that in the end, and just having those people to spot me and help and that's really what I want to do for the children in return when they think they can't do it, just spend some time with them now and that's what I'm doing in year 6 really all the time is have these small groups - right what are we stuck on, what are we going to do, and like believing that they can do it so that they have that same kind of realisation that I did...		Appears reflective (but not sad) during first few words, then pausing to recall / looks frustrated (remembering frustration?), then as narrative turns to the role of the Psychology teacher body language becomes taller, smiling more. When speaking about replicating those positive experiences teacher speaks definitively and fondly.	**RQ1** (insights into pedagogical stance - phrasing and ways of seeing the role of teacher and learner)		**Growth** (later teenage years - return of perceived inability, followed by influencing figure (another role model? Consolidates view on what a teacher can be buiding on English teacher above?) investing time and extra effort for individual learner. Directly translates this to her own current practice - putting in personalised targeted time and effort to	**Identity** (role of self, relationship with teacher), **Agency** (in learning scenario)

The data signposted was then copied and pasted into a separate document under the headings of each Funnels of Influence model aspect (e.g. Roots, Growth). Data was grouped so that references to similar matters could be reviewed alongside each other - seen in Figure 3.23.

Figure 3.23: Interview narrative grouped by Funnels of Influence aspect



Growth

Growth *(Teenage experiences - perceived inability followed by influencing figure (role model of what a teacher can be?) showing what is possible / positive mindset).*

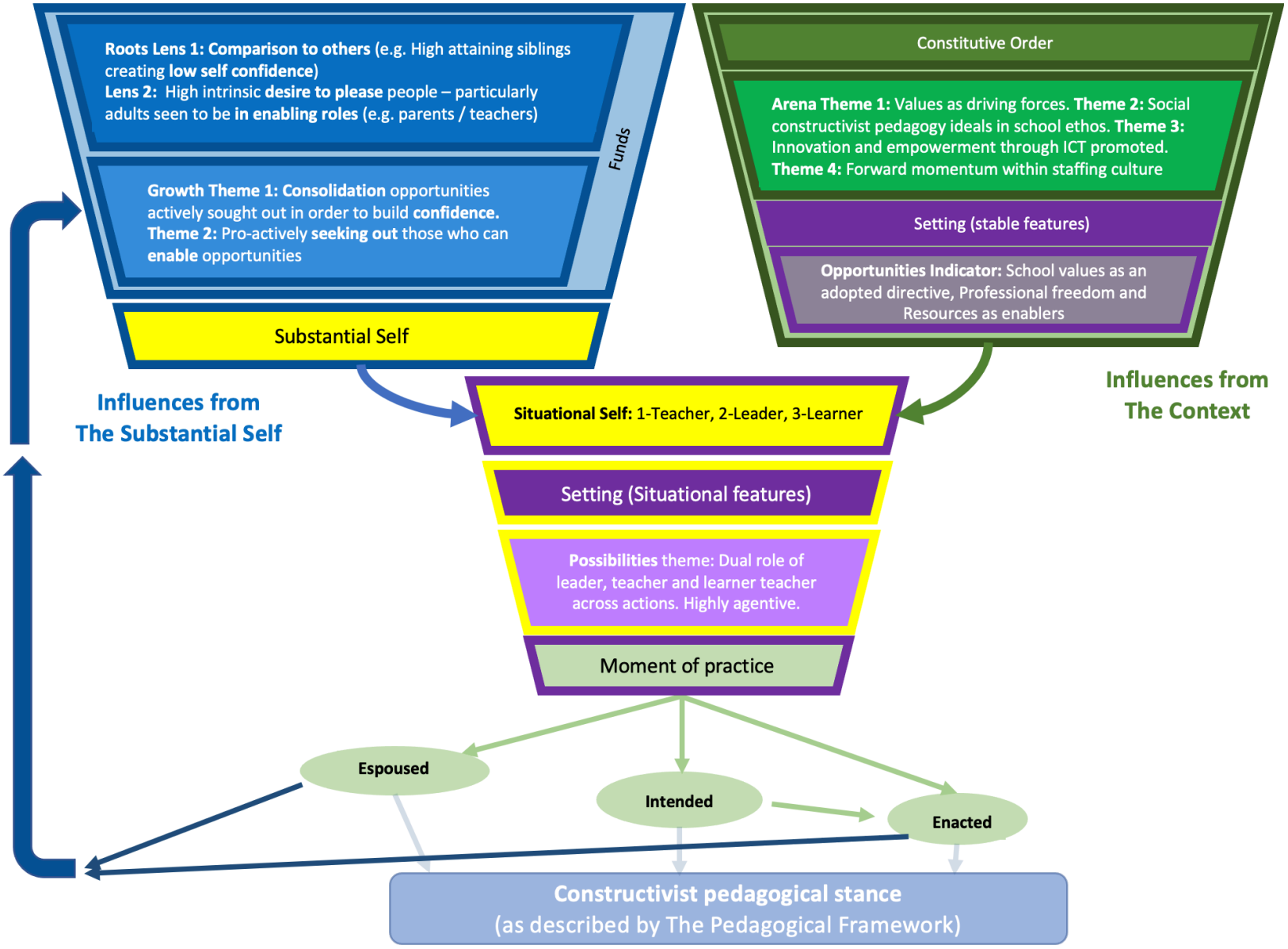
- I always thought that English was my subject that I would never be able to do, and in Year 10 I got a teacher [name], she was just *amazing* at bringing out bits of English I *can* do - so I can infer when I'm reading, I can understand characters motives, I can bring together ideas, but when it came to writing my ideas would become muddled and she just made me believe through her questioning and her encouragement that I could just do this I just needed a bit of support a bit of structuring, and that made a huge difference...
  (T2-1, 11.16) -

Growth *(later teenage years - return of perceived inability, followed by influencing figure (another role model? Consolidates view on what a teacher can be building on English teacher above?) investing time and extra effort for individual learner. Directly translates this to her own current practice - putting in personalised targeted time and effort to enable that for others).*

- going to college I did psychology and my memory for facts is really poor… and a lot of the psychology was about just remembering those case studies and I remember just feeling um… overwhelmed by it, I couldn't do it, I didn't turn up to my mock and my teacher didn't she didn't tell me off or anything she just came and asked me what's going on and I just said I just feel overwhelmed by this and she said right just write an essay we will go through it one to one, she just gave me that extra time, um... and um I started going to see her more regularly outside of my lesson times and she just put in that extra bit of effort *for me* which then made me do that in return and I did really well in that in the end, and just having those people to spot me and help and that's really what I want to do for the children in return when they think they can't do it, just spend some time with them now and that's what I'm doing in year 6 really all the time is have these small groups - right what are we stuck on, what are we going to do, and like believing that they can do it so that they have that same kind of realisation that I did…
  (T2-1, 11.59)

It should be noted that as referenced throughout the analysis processes described above, this extraction remained dependent on the cumulative familiarity with the whole dataset and the dialogic overtones within it. However, this study did not use the formal Constant Comparison Method as introduced by Glaser and Strauss (1967) which samples, codes and compares a whole dataset in order to draw out grounded theory. This is because, as Thomas and James (2006) argue, it does not take into account preconceptions, something which Glaser and Strauss argue as necessary to eliminate and so consequently, their method does not align with the ontology of this study. But, the principles outlined by Glaser and Strauss (1967, p.105), were utilised: compare incidents (in this study transcript extracts), integrate categories (in this study grouping under Funnel headings), delimiting the theory (in this study reducing the themes within individual Funnel aspects to core trends), and finally writing the theory (in this study generating a personal Funnels of Influence for each teacher). As a result of this process, a personal Funnels of Influence was created for each individual teacher, as seen in the example in Figure 3.24.

Figure 3.24: Example of a Personal Funnels of Influence for Case 2



It should be noted that because the Funnels of Influence Model is about a specific moment of practice, the themes noted for teacher's personal Funnels of Influence are those which were identified as being present across this dataset – bounded by the discourse and practice in this study. Additional data from further visits, discourse and observations would create and/or adjust themes, so this cannot be conceived as representative of the teacher, but only of the themes which emerged specifically within the bounds and RQ of this study.

The process of responding to RQ3 drew upon analysis from RQ1 and RQ2, alongside analysis of the broader contextual influences that were known to have shaped the individual teacher up to the point of data generation. This allowed for interpretation of both the relationships and what had influenced those relationships. This is set out as a discussion for each case in Chapter 5.

3.9 Summary

The first part of Chapter 3 addressed using case study as a methodology, setting out the role of participants, ethical considerations and detail about methods and procedures. Then the chapter laid out the processes used within data analysis; using examples from across the cases to illustrate what took place and to illustrate how data was interpreted robustly by probing further than literal meaning within the spoken word. Use of the Funnels of Influence Model was introduced both in its role guiding the generation of data, and then in its role as signposting data from different aspects known to influence teacher's espoused, intended and enacted pedagogical stances. Through foregrounding influences affecting teacher's espoused, intended and enacted pedagogical stances, more robust interpretations are possible – utilising awareness of what to prioritise within the data, and how to interpret direct and inferred meaning, dialogic overtones and accumulated meaning. As a result of these robust and honest interpretations a more accurate alignment between the teacher's implicit pedagogical stance and the pedagogical approaches outlined within The Pedagogical Framework could then be made. Finally, this chapter explained how the analysis process provided findings which could then be drawn together to respond to each research question. What now follows, in Chapter 4, are the findings from each case for these research questions.

Chapter 4: Findings

4.1 Introduction

Having completed the analysis as described in Chapter 3, the purpose of Chapter 4 is to present what this study found out. Findings are first organised by school, and then within each school by case and then within each case by research question. As stated in Section 3.4, School A contained Cases 1 and 2, and School B contained Case 3.

In responding to the research questions within each case, findings are presented sequentially working through RQ1a, RQ1b and RQ1c in order to respond to overarching RQ1 and then through RQ2a and RQ2b in order to respond to overarching RQ2. RQ3 draws together findings from RQ1 and RQ2 through the form of a discussion which is addressed in Chapter 5.

Section 3.8 set out the analysis processes used in this study. Within Chapter 4, detailed exemplification within Case 1 illustrates the richness of data involved in these processes.

As set out in Chapter 3, the Funnels of Influence Model was used to inform data generation. Consequently, analysis was able to surface influences (and their relative importance) affecting the teacher. This enabled more credible data interpretation including how the teacher aligned with approaches in The Pedagogical Framework (Table 2.2). Terminology from the Funnels of Influence Model and The Pedagogical Framework (TPF) is used throughout Chapter 4, drawing on the precise definitions set out in Sections 2.4.3 (Funnels Model) and Section 2.3.1 (TPF) respectively.

The Funnels of Influence model highlights the importance of understanding the enduring features of the school Arena (e.g. routines, affordances, expectations) in order to contextualise features surfaced by the individual teacher. As set out in Section 2.4.3 the school Arena frames the Opportunities that are available to the teacher as well as affecting the Identity through which they perceive those Opportunities as Possibilities which they can then take up through practice.

4.2 School A

As introduced in Section 3.2.4, Cases 1 and 2 were established teachers located in School A, a three-form entry primary state school in the south of England. Table 3.1 gave a summary overview of the school and Appendix M contains further details. The headteacher described the school as having ‘Ethos Values’ (innovation, nurture, success, integrity, responsibility, excellence) which were used by staff in ensuring that their school-based decisions and actions were principled (HT1,12:24). These values set the tone for what was expected of staff, and both Teacher 1 and Teacher 2 referred to the values when discussing their practice.

The headteacher explained the intentions of the school as:

> "we look at preparing children for the future… that whole rounded approach" (Extract 1: HT1, 2.03)

This focus on preparing children for the future manifested itself in a number of ways. First, the headteacher talked passionately about a dedication to every child, and the consequent expectations given to staff as:

> "they might come to me and say we've done really well we've got 75%… and I might go yeah ok but what about the other 25?" (Extract 2: HT1,13.42)

What was not present in the headteacher interview data were any explicit expectations about exactly how teachers should address the learning needs of the children.

The headteacher also spoke about the ambition to meet the needs of all children as affecting a number of Arena factors, including the budgetary decision that:

> "we spend a lot of our funding here on extra teachers, so we have more teachers than we have classes… we can have different groups targeted" (Extract 3: T2-1, 22.11)

The Arena emphasis on increasing teacher capacity in order to target specific groups of children affected both Case 1 and Case 2. As a result of both Teacher 1 and Teacher 2 combining senior leadership roles with teaching, they were assigned intervention groups rather than whole classes for their timetabled teaching practice. Whilst the headteacher placed an emphasis on closing the achievement gaps (HT1,13.42), the teachers could have taken different pedagogical approaches to doing so. For example, each teacher may have seen the nature of an intervention group as being extracted from the year group as addressing the achievement gap in itself. Or, they may have seen the intervention group as the starting point for very targeted differentiation of the different needs within it.

The headteacher explained what they expected of their staff in relation to this:

> "they look at the children they've got… all I ask is that they provide an education that is going to move the children that they have in that year, in that moment on…" (Extract 4: HT1, 21.08)

Another influence within data about the school Arena was that the headteacher saw the role of ICT as central to achieving the wider vision for the school in two ways. First was that:

> "some of our children struggle with so many different areas… so they use technology to support them…" (Extract 5: HT1, 13.42)

The second was that:

> “if you’re at home and you want to find something what do you do? Well I pick up my laptop, my iPad. So why can’t we replicate that here?” (Extract 6: HT1, 2.34)

There are many possible ways that this could have translated into what the Funnels of Influence model refers to as Opportunities and Possibilities for the teachers. For example, using assistive technologies and 1:1 use of devices within classroom activities or an emphasis on technology being used predominantly by children with learning difficulties. The headteacher explained that there was a range of ICT available within the school:

> “Teachers have got all these handheld devices, laptops, computers, green screen, digital printing, 3D printing…” (Extract 7: HT1, 1.02)

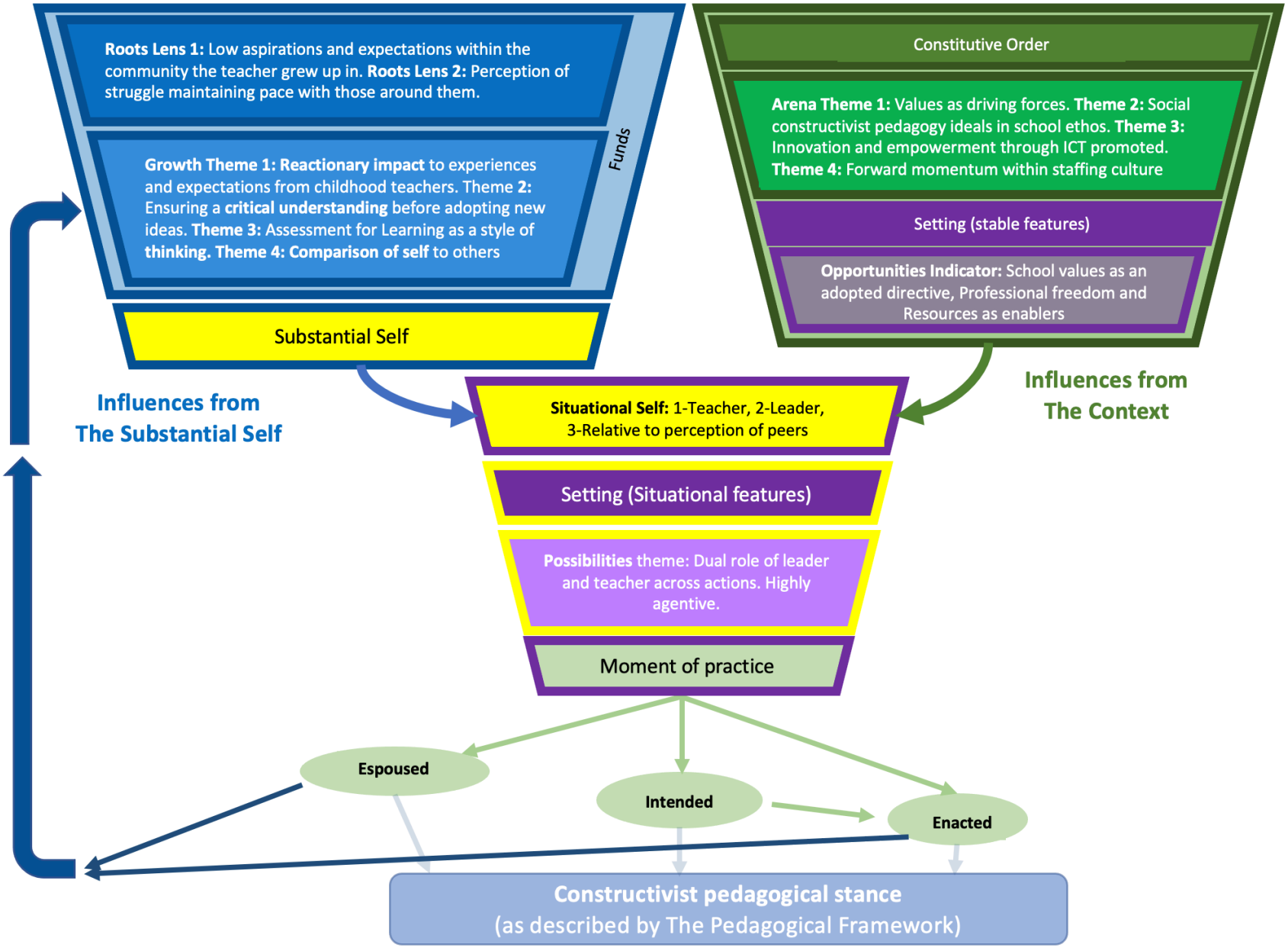
What was not present in Headteacher 1 data were any explicit expectations about exactly how teachers should use ICT. This aligned with the earlier finding that teachers were expected to scaffold and facilitate reflexively to meet the needs of the specific children that they were teaching at any given time, but they were not explicitly told how to do so.

4.3 Case 1

As set out in Section 3.4, Case 1 centred around an established teacher who combined senior leadership responsibilities with teaching intervention groups. A summary of key information about the teacher was set out in Table 3.2.

As described in Section 3.8.8, a personal Funnels of Influence was identified for each teacher. Figure 4.1 shows a personal Funnels of Influences for Teacher 1, reflecting the notable or recurring themes across the Teacher 1 dataset.

Figure 4.1: Teacher 1 personal Funnels of Influence



To illustrate, on the left of the diagram in mid-blue are Growth themes, one of which being that the teacher ensured that they had a critical understanding of new ideas before adopting them. One of many examples of this is where the teacher spoke about learning to use QR codes, and how they felt their approach was different to their peers:

> "I have to go through a learning process myself, which means. I have to commit time to that… I'm the sort of person that has to sort of go away, think about it, read about it, investigate it myself, have a go, and then if I get a sticking point I will then go to someone and say ah I'm really struggling, this won't work, can you explain why" (Extract 8: T1-1a, 1.02)

Data generated as a result of using the Funnels of Influence aided the interpretation of data generated for each research question. Illustrations are embedded throughout the findings.

4.3.1 Responding to RQ1a

As set out in Section 3.8.1, analysis and interpretation for RQ1a sought to identify the teacher's espoused pedagogical stance. Data often relates to more than one TPF category, and so findings are not presented by category. However, all TPF categories (Purpose of schooling / educational goals, Views of learner and learning, Views of teachers and teaching and Views of knowledge) are addressed and drawn together at the end of each findings section.

Within interview data, Teacher 1 described their pedagogical views explicitly as:

> "that sort of highly facilitative approach to learning… probably in a sense it links to constructivism" (Extract 9: T1-1d, 10.46)

Furthermore, that they saw their role as:

> "saying right they haven't got that bit so what came before, what came before… What point can I pitch it and then brace it back up so that children will understand?" (Extract 10: T1-1b, 9.52)

As described in Section 3.8.1, The Pedagogical Framework (Table 2.2) was used to compare data about teacher's pedagogical stance to either Behaviourist, Constructivist or Sociocultural beliefs. For this teacher, as illustrated through Extracts 9 and 10, the emphasis was on the teacher scaffolding the learning towards knowledge that the teacher had pre-identified. Comparing Extracts 9 and 10 to TPF descriptors, the teacher's emphasis on constructing knowledge from the perspective of the subject rather than the learner may rule out Sociocultural alignment. The teacher's emphasis on scaffolding rather than imparting knowledge suggests alignment with Constructivism is more likely than Behaviourism. However, as set out in Section 3.8.1, isolated extracts risk fragmenting the data, and taking data at face-value risks misinterpreting meaning within it.

The Funnels of Influence Model had been used to generate data which then signposted influences which were at play within the teacher's espousals.

Data from Teacher 1 pertaining to what the TPF refers to as a View of schooling and educational goals appeared through their reflecting on the role of technology in children's lives:

> "…technology is such a massive part of their lives… and because that's how they see the world, coming into a classroom where someone is giving you instruction, that's not really going to do it is it?... in Australia in the outback, they used to have the teacher radio stations didn't they… I often wonder how much that has evolved over recent years through tablet technology… so they'll be skyping and someone would be modelling, and then they'll be practising… you start to wonder in the future what will be the place of the classroom… I'm not sure what place the classroom would have. Other than a social means of engaging with other people on problem solving. Which is an essential ingredient for work" (Extract 11: T1-2a, 20.23)

Comparing descriptions such as this to the TPF, the focus on modelling and practicing as preparation for the workplace suggests sociocultural alignment as unlikely. The focus on social engagement suggests Constructivism rather than Behaviourism. Extract 11 was not specifically addressing the purpose of schooling but revealed Possibilities through the teacher's reflections about the role of technology. The teacher's reflection in Extract 11 contrasts with data elsewhere which was more definitive, yet potentially just as revealing. For example, when talking about approaches to teaching, Teacher 1 said that:

> "things like the Key Stage 2 SATS being the measure of progress for a school which is driving schools to teach in a way that is inappropriate… because I don't care what people say, you know, they will teach to those tests." (Extract 12: T1-1b, 10.34)

The difficulty with this kind of data is that it consists of conflicting elements. For example, the espoused statement about teachers teaching to the test may align with TPF Behaviourism descriptors - the teacher's linking of 'teaching to the test' with either their own ambitions for those tests, or expectations placed upon them to ensure that the children perform in the tests. However, the statement in Extract 12 is positioned as referring to 'other' teachers. Framing theory (as discussed in Section 3.8.1) would suggest that the use of the pronouns in "I don't care" and "they will" is the teacher attempting to distance themselves from "teach to those tests" - suggesting that Teacher 1 does not align with those views. However, further data challenges this distancing because the teacher immediately connects 'teaching to the test' with accountability:

> "because that's how they are going to be determined as a coasting school or whatever it is [witheringly]. You know, it's… it's… wrong, so you know there's that in the way" (Extract 13: T1-1b, 10.34)

In talking about "teaching to the test" (Extract 12) the teacher could have explained their objections in many ways – for example, with reference to the impact on limiting children's learning Opportunities and experiences or restricting teaching time. However, their focus on accountability reflected their dual role as teacher with senior leadership (SLT) responsibilities. This identity influenced the way in which the teacher spoke about teaching (through dialogic overtones within the data - see Section 3.7.3). This included that the teacher was partly accountable for the overall performance of the school's teaching and learning - thus whether or not the school would be determined to be 'coasting' (Extract 13). The teacher referencing this as being 'in the way' is therefore not as removed from their own belief as it would initially appear – their espoused view about not wanting to teach to the test may be informed by one set of influences, but there are conflicting Arena and Identity influences encouraging them to conform to the testing agenda. Comparing this kind of process-oriented view with TPF descriptors suggests that sociocultural alignment is less likely. Furthermore, the friction in the teacher's espousal described above makes it unlikely that they would align with a Behaviourist view on the purpose of schooling and educational goals.

The teacher's self-identified alignment with Constructivism therefore required further probing - not necessarily the literal words spoken (which could be interpreted as aligning), but by the dialogic overtones within them. This can be illustrated further by considering the role of the school Arena, the teacher's leadership identity and how the teacher spoke about meeting the needs of the range of children in their class:

> "How are you going to manage diminishing the difference for your children from those middle or vulnerable groups?" (Extract 14: T1-1c, 2.32)

Here, the vocabulary is important to consider as part of interpretation because the terminology – 'diminishing the difference' and 'vulnerable groups' were specific terms used by national accountability frameworks applicable to this school at the point of data generation (DAISI, 2019; Ofsted, 2019). Use of those terms inferred expectations that originated beyond the school Arena. Consequently, referring to those terms - in conjunction with preceding data that foregrounded the teacher and teacher planning - suggests that Teacher 1 was conforming to expectations rather than espousing implicit views. An alternative framing might have been where the teacher instead spoke about addressing the needs of children who were not already confident and successful learners. Such a framing would still reflect the teacher conforming pragmatically to expectations but would suggest greater alignment with their implicit views. Thus, whilst the narrative from the teacher attempts to distance themselves from prioritising a focus on accountability

measures, it becomes possible that the teacher is framing their responses in an attempt not to be perceived that way, rather than espousing an implicit view.

Data that had been signposted as relevant to RQ1a was probed to further understand the influences affecting espousal elsewhere. For example, the teacher spoke about their pedagogical approach:

> "that [reviewing children's progress from the previous lesson] then enables me to think through how I need to adjust my teaching… I can start thinking about the level of questioning, the types of questioning." (Extract 15: T1-1b, 4.30)

Furthermore, the teacher spoke about children's practical uses of working walls (write-on walls) and learning videos (instructional videos pre-recorded by the teacher and available to children to independently access and watch within lessons):

> "if they are stuck at any point they can rewind and look at something several times, or they can go to the wall several times and wrangle with things, so it's much more about your questioning them, rather than the development of the skills." (Extract 16: T1-2, 6.58)

The grammar within data extracts is important to note in this case because it focuses on the teacher (e.g. "I can start thinking…", "I need to adjust my teaching…") and the subject "rewind and look at something several times" more than the learner. This grammatical feature is part of what discourse analysis terms generative semantics (Tannen et al., 2015) - by framing beliefs around the teacher rather than the learner, the teacher's implicit ideology becomes surfaced. This potentially suggests a Constructivist belief where the teacher is the authority within the classroom; scaffolding learning to achieve established knowledge claims. By comparing the teacher's focus on scaffolding through questioning and dialogue with the TPF descriptors on Views of knowledge it is possible to see that there is greater alignment with Constructivist rather than Behaviourist or Sociocultural views.

The focus on dialogue as part of learning was also found elsewhere, for example the teacher's description about marking children's books and then seating children in pairs based on assessments sheds further light on their views on the (social) nature of school (as orchestrated by the teacher). For example:

> "They have got to get good at talking because the first thing will be 'communicate with your partners where you go to yesterday, what you feel your next steps are, and how they can help you." (Extract 17: T1-3a, 0.00)

Within this description, the teacher was illustrating the importance they placed on the role of social interaction in learning - highlighting socially orientated, constructivist views. Probing deeper, the social opportunities were determined by the teacher's authority; defining and managing both who and what was considered valuable within classroom

discourse. This illustrates greater alignment with Constructivism within TPF learner descriptors; with learners neither passive recipients (Behaviourism) nor agentive in decisions about who they socially interact with or what that interaction is about (Sociocultural).

In Extract 17, the emphasis on assessment could have been interpreted as a Behaviourist view. However, the focus reflected how the teacher valued dialogue within learning – a trend across their dataset. The emphasis on social interaction as a tool for mediating learning could be interpreted as a Sociocultural view. However, the disciplined way in which the teacher encouraged dialogue to focus on specific subject matter suggested that as unlikely. Furthermore, the teacher's focus on the importance of peer communication about next steps may have been a form of Behaviourist discipline; training children to undertake a process. But that could be interpreted in a number of ways. That process may have been set up in order to: reduce the burden on the teacher, develop lifelong learning skills, support classroom behaviour management, distance the teacher from the children or allowing the teacher to focus on target children.

It is therefore important to consider the complete dataset and the discourse features within it to draw out meaning rather than fragmented literal interpretation of the spoken word. For example, considering the latter point above about children talking to each other (rather than the teacher) about their assessment feedback, the teacher's descriptions of independence were not what they first appeared at surface level. Initially, they described their views as:

> "if you go into a class and you can't see the teacher almost, that is ideal really, because you really want the children to own their own learning, rather than be waiting on you to tell them what to do next. You need them to be independent." (Extract 18: T1-1d, 6.26)

At surface-level this could be interpreted as the teacher inferring the importance of Agency for learners – suggesting Sociocultural views. However, the 'independence' was later described by focusing on physical matters rather than psychological. For example:

> "it's accessibility that enables them to be independent learners" (Extract 19: T1-2a, 20.23)

This was described as:

> "the room is geared up towards the children… they can self-resources… they don't have to ask you… the seating arrangements are flexible such that you can move the tables and equally move the children's spaces depending on where you see their need. That assessment for learning is really enabling you to see who is where and what intervention is needed… specific to a group or individual, such that it moves learning on…" (Extract 20: T1-2, 21.05)

At surface level (Extract 20), the data initially appears to suggest that the teacher prioritised enabling children to be independent learners. This can be interpreted in many ways including; training in processes thus removing burden on the teacher (tending towards Behaviourism), facilitating longer term skills (suggesting Constructivism) or the enabling meaningful agency within learning (suggesting Socioculturalism). It is the other aspects of data (e.g. Extract 17 and 18) that help to clarify the teacher's underlying intentions. Further intentions become surfaced when also probing what appeared initially to be unrelated aspects of the data. For example, when the teacher talked about their own professional direction - they wanted to lead teaching and learning rather than operational management. Those first appeared unrelated, but actually became highly revealing:

> "I don't care when break time is… I care what's going on in the classroom. I don't care what you're doing outside." (Extract 21: T1-1b, 33.18)

When talking explicitly about teaching and learning, the teacher framed their responses to suggest that children's needs were central to their actions. However, in Extract 21 there is a clear boundary within this teacher's thinking about learning being in-the-classroom and their role not incorporating beyond-the-classroom. This is compounded by an absence of any data for this teacher which discusses children's wider lives, needs or experiences beyond the classroom, nor any pastoral matters relating to children. This could be due to the nature of the conversations between teacher and researcher. However, the most likely interpretation of this extract – because of the way that the teacher framed discourse across the wider case dataset - is that the teacher sees the classroom as teacher-centric, and that any independence for children is tied to the consequences on the teacher within the classroom (e.g. reducing demand on teacher capacity) rather than beyond it (e.g. lifelong independent learning skills).

The teacher often spoke about the role of formative assessment and the importance of the teacher understanding where each child was in their learning based on marking their previous lesson's work. Furthermore, that through that process the teacher could plan next steps for groups of children who were at similar stages in their learning, which encouraged children to talk together during the lesson – focusing on supporting each other in that specific subject area. For example:

> "Assessment for learning is really enabling you to see who is where and what intervention is needed… specific to a group or individual, such that it moves learning on" (Extract 22: T1-1d, 21.05)

This focus on the teacher's role and targeted intervention aligns with TPF descriptors for Constructivism relating to Views on teachers and teaching.

Finally, Teacher 1 talked about an ideal professional environment where there would be increased amounts of time for teachers to reflect and plan learning for their children which

at first appears highly child-oriented (T1-1b, 5.45). However, whilst it initially appears that the teacher was focusing on the wider needs of the children in order to plan more effectively for their learning, they are not broadening that lens to examine the implications of doing so; the disruption to children both pedagogically, socially and emotionally. The focus remains on the teacher not on the learner, despite the surface appearance.

In conclusion for RQ1a, this teacher aligned most persuasively with Constructivism both in terms of their deliberate espousal, but also in what they inadvertently espoused through wider narrative – as illustrated above. As outlined above, it also appeared that the teacher's form of Constructivism was centred around the teacher (rather than the learner).

4.3.2 Responding to RQ1b

RQ1b asks what the teacher's intended pedagogical stance is, and as such previous findings which align Teacher 1 with espoused Constructivism were used as a form of hypothesis – probing intentions that aligned or differed from that alignment. This was achieved using the processes set out in Section 3.8.2.

Specific intentions within practice were unpacked. For example, Teacher 1 set up QR code linked instructional videos for a class and then children used devices independently to access the videos if and when they found them helpful during a sequence of scaffolded tasks. The intention set out by the teacher was that the children could re-watch a teacher demonstrating how to do a particular mathematical procedure (T1-2a, 11:06). The teacher spoke about their intentions for this practice as encouraging children's independence within learning. However, whilst the teacher was making learning resources more accessible, there were parameters around that which affect how it is interpreted pedagogically. For example, the resources were identified and made available by the teacher rather than the learner, and the resources were chosen on the basis of the subject not the learner - making Sociocultural alignment unlikely. Elsewhere, related data about this practice highlighted that children could choose when to access the videos (if at all) during the lesson, based upon their progress through a sequence of activities which had been pre-determined by the teacher which suggests a more likely alignment with Constructivism. Each intention was unpacked to reveal its underlying pedagogical alignment and Figure 4.2 sets out a full list of intended practices for Teacher 1, organised by the categories that they were grouped into (described in Section 3.8.2). Each row represents a category. The third column signposts examples from within that category.

Figure 4.2: Grouping of intended practices within Case 1 dataset

Category	Summary of Intention	Examples of this Intention within dataset
1	The teacher making resources or opportunities more accessible in order to make additional learning achievable.	(e.g. T1-1d, 18:43, T1-2a, 11:06, T1-3a, 11:02)
2	Teacher actions that enable children to learn more effectively	(e.g. T1-1b, 19:32, T1-1d, 18:43, 21:05, T1-2a, 12:57, T1-3a, 2:10)
3	Teacher actions that address specific needs of those being taught	(e.g. T1-1b, 19:32, T1-2a, 29:07)
4	The teacher finding more efficient ways of working	(e.g. T1-1a, 0:42)
5	The teacher carrying out actions with the intention of increasing the impact of teaching	(e.g. T1-1a, 2:34, T1-1b, 3:04, T1-1d, 18:43, T1-2a, 5:39)
6	The teacher amending actions to free up teacher capacity in order to use teacher time more impactfully	(e.g. T1-2a, 8:06, 14:03, T1-3a, 9:38)
7	The teacher's self-identified role as a facilitator of learning for others	(e.g. T1-1a, 3:12, T1-1b, 2:18, 13:46, 29:49, 32:46, T1-1d, 6:26)
8	The teacher's high levels of reflection on action and reflection in action	(e.g. T1-1b, 5:19, 30:07, T1-3a, 21:54)
9	The teacher conforming to local or national policy expectations	(e.g. T1-1b, 10:34)
10	The teacher displaying an outcomes based mindset	(e.g. T1-1a, 1:02, T1-1b, 27:11)
11	The teacher reacting to their own experiences of teachers from childhood	(e.g. T1-1b, 19:06, 26:14, 29:15, T1-2a, 26:58, T1-3a, 10:20)
12	The teacher's fear of not being 'left behind' by other colleagues (keeping up with 'the latest' ideas and innovations)	(e.g. T1-1a, 2:43, T1-1b, 1:53)

For each of the categories of intended practice the original data was considered in context of its dialogic overtones and preceding data – as illustrated in the example above for Category 1. Those intentions were then compared to The Pedagogical Framework in order to identify areas of alignment - summarised in Figure 4.3.

Figure 4.3: Mapping of Teacher 1 intentions to TPF descriptors

	Summary of Intention	Mapping to The Pedagogy Framework
1	Teacher creating resources which children use to access instruction independently (e.g. QR linked Films)	"Teachers are the authority in scaffolding learning to achieve established knowledge claims". (**Views of the teacher and teaching, Constructivism**) **ALSO** "Knowledge is abstracted and available for transfer across situations" (**Views of knowledge, Constructivism**)
2	Teacher's self-identified role as a facilitator of learning for others (children, familes and colleagues)	
3	Teacher providing regular feedback to groups of children (e.g. through SeeSaw)	Teachers do not guide but actively direct experience through scaffolding and the dialogue between children until they achieve stand-alone competence in conceptual understanding and subject specific problem solving or ways of doing. Teachers direct learning through the zone of proximal development. (**Views of the teacher and teaching, Constructivism**)
4	Teacher differentiating by through feedback and task assignment (e.g. through SeeSaw)	
5	Teacher assessing children's work and providing group feedback (e.g. shared misconceptions)	
6	Teacher providing resources to encourage children to learn outside of lesson (e.g. flipped learning, consolidation)	"Knowledge is abstracted and available for transfer across situations" (**Views of knowledge, Constructivism**)
7	Teacher displaying an outcomes (knowledge acquisition) based mindset (e.g. maths knowledge, benefits of ICT before engaging with it)	
8	The teacher's high levels of reflection on action and reflection in action	"Motivation is intrinsic but it is to understand how others in society have constructed ways of seeing and understanding the world that provide the learner with power to be selfdetermined, make informed and socially aware decisions and be socially responsible - a literate citizen". (**Views of learner and learning, Constructivism**)
9	The teacher reacting to their own experiences of teachers from childhood (e.g. intrinsic motivation not to replicate practices that had negative impact)	
10	The teacher's fear of not being 'left behind' by other colleagues (keeping up with 'the latest' ideas and innovations)	
11	Teacher being more efficient through use of ICT (e.g. word processing, re-using resources)	These do not map to a specific model of pedagogy on The Pedagogical Framework
12	The teacher conforming to local or national policy expectations	

The summary seen in Figure 4.3 reflects how each category of intention aligned with a model of pedagogy (TPF). For Teacher 1 this mirrored the findings of RQ1a as being most aligned with Constructivism. In addition to this, there was also compelling evidence that their Constructivist intentions were framed around the needs of the teacher.

4.3.3 Responding to RQ1c

The purpose of RQ1c was to identify how the teacher's observed enacted practices aligned with the models of pedagogy set out by The Pedagogical Framework. Data generation and analysis exposed the researcher to the teacher's espoused and intended pedagogical stance prior to experiencing their enacted practices which affected the lens through which it was viewed. The process for RQ1c made this bias explicit by using the findings of RQ1a and RQ1b as a form of hypothesis – seeking ways in which the teacher's enacted practices agreed or contradicted the hypothesis that this teacher's implicit pedagogical stance was aligned with Constructivism. This converted the risk of a bias into a tool for checking the robustness of findings.

Teacher 1 was observed three times teaching different Year 6 intervention groups; for maths, reading and writing. Each observation took place in a classroom used for intervention groups which was set out differently for each lesson observed. Full observation vignettes are set out in Appendix O. Section 3.6.5 set out how observation data was generated, Appendix I contains the observation guide setting out what the focus

areas were, Section 3.7.4 explains how observation data was processed, and Section 3.8.3 set out how observation data was analysed.

Key pedagogical features were identified from across the observation data. This can be seen in Table 4.2.

Table 4.2 Key pedagogical features across Teacher 1 observations

Focus area	Features across observations
Inputs:	These explained how the observed lesson built upon previous learning, how the new learning could be applied to a range of contexts – drawing on other areas of previous or current learning (e.g. topics), and how it would later be built upon through future learning (Obs.1, 1.6, Obs. 2, 1.2, Obs. 3, 1.22);
Activities:	These were varied; combining practical activities requiring the children to move around the classroom, use write-on walls (Obs. 1, 1.11), undertake practical application of ideas, opportunities to practice ideas before committing to books or answer sheets (Obs. 1, 1.6), and involved resources which enabled children to be more independent (Obs.1, 1.13, Obs. 2, 1.2, 1.9), or allowed for differentiation within the class (Obs. 3, 1.24);
Language:	The teacher language was very deliberate; with speech gentle and purposeful (Obs.2, 1.15). The teacher used precise vocabulary to give feedback to children (Obs.1, 1.6, 1.8, Obs.2, 1.6, 1.10), descriptive praise, clear instruction (Obs. 2, 1.11), warm encouragement and firm expectations (Obs. 2, 1.2, Obs.3, 1.21);
Links:	The teacher adapted explanations and activities very subtly to meet the needs of children during the lessons (Obs.1, 1.6, Obs.2, 1.4); and was discrete about interventions so that children appeared to maintain dignity even when struggling with tasks or ideas (Obs.3, 1.25);
Relationships:	The teacher used a range of ways to encourage different types of collaboration; through small groups working independently of the teacher (Obs. 1, T1-2a, 2:40) and seating children in changing pairs so that discourse focused on learning rather than social (Obs. 3).

Using the first focus area – Inputs – data from Observation 3 can be used to illustrate these common features. For example, the teacher:

- built upon previous learning by starting with a discussion about a recent visit to the theatre, and asking children to recall the issues about friendship surfaced in the show that they watched (Obs.3,1.18)
- explained the link between the show and the writing task being asked of the children – drawing on the show's friendships stories as emotional hooks to help form ideas (either from the show or triggers from their own experiences), and to help identify relevant vocabulary for their talk and writing (Obs.3,1.22)
- related the discussions about the issues emerging to learning that children were part of in another lesson about philosophical questions (Obs.3,1.23)

Each of these aligns with TPF Constructivist descriptors about teacher's eliciting prior learning, scaffolding new learning as a result of that, and working towards established knowledge claims – as reflected in the right-hand column.

The features set out in Table 4.2 above were then mapped to The Pedagogical Framework, with TPF descriptors aligning with multiple features as seen in Table 4.3.

Table 4.3: Mapping of observed features of teacher's practice with TPF descriptors

Focus area	Features across observations	Mapping to The Pedagogy Framework
Inputs	These explained how the observed lesson built upon previous learning, how the new learning could be applied to a range of contexts – drawing on other areas of previous or current learning (e.g. topics), and how it would later be built upon through future learning (Obs.1, 1.6, Obs. 2, 1.2, Obs. 3, 1.22);	"Teachers are the authority in scaffolding learning to achieve established knowledge claims" (**Constructivist, Views of teachers and teaching**). "Knowledge is constructed it doesn't represent an objective external reality" (**Constructivist, Views of knowledge**)
Activities	These were varied; combining practical activities requiring the children to move around the classroom, use write-on walls (Obs. 1, 1.11), undertake practical application of ideas, opportunities to practice ideas before committing to books or answer sheets (Obs. 1, 1.6), and involved resources which enabled children to be more independent (Obs.1, 1.13, Obs. 2, 1.2, 1.9), or allowed for differentiation within the class (Obs. 3, 1.24);	"Younger children need concrete experiences older children can begin to abstract and create models grounded in practical problem-solving activity" (**Constructivist, Views on learners and learning**)
Language	The teacher language was very deliberate; with speech gentle and purposeful (Obs.2, 1.15). The teacher used precise vocabulary to give feedback to children (Obs.1, 1.6, 1.8, Obs.2, 1.6, 1.10), descriptive praise, clear instruction (Obs. 2, 1.11), warm encouragement and firm expectations (Obs. 2, 1.2, Obs.3, 1.21);	
Links	The teacher adapted explanations and activities very subtly to meet the needs of children during the lessons (Obs.1, 1.6, Obs.2, 1.4); and was discrete about interventions so that children appeared to maintain dignity even when struggling with tasks or ideas (Obs.3, 1.25);	"Teachers elicit children's prior knowledge and model learners' knowledge through process of testing and retesting. They provide contingent guidance moving individual learning towards specified curriculum goals." (**Constructivist, Views of teachers and teaching**)
Relationships	The teacher used a range of ways to encourage different types of collaboration; through small groups working independently of the teacher (Obs. 1, T1-2a, 2:40) and seating children in changing pairs so that discourse focused on learning rather than social (Obs. 3).	"Learning occurs in dialogue with others in activity. It is through dialogue that meanings emerge between people." (**Constructivist, Views of learner and learning**)

As seen in the bottom row of Table 4.3, Teacher 1 used a range of ways to encourage different types of collaboration; with one group of 4 higher-attaining children working separately from the teacher and watching a video of group feedback from the previous lesson's work together before progressing onto assigned work. At the point of directing the group to work together the teacher encouraged those children to talk together about the task and to support each other during the activity (Obs.1, 1.6). The fluidity with which the children discussed their work suggested that this was familiar practice. This kind of practice was then compared to TPF descriptors – not as an isolated example but as an observed common feature of the teacher's observed enacted practices. The teacher's emphasis on dialogue as part of the learning process suggested that Behaviourist alignment was unlikely. The pre-defined parameters of the dialogue (i.e. the teacher directing the children's conversation to remain focused on the specific task and objective) suggested Sociocultural alignment was also unlikely. Specifically, children's dialogue was guided towards mutual internalisation (Constructivist) rather than negotiation of meaning (Sociocultural).

This mapping process suggested that the teacher's observed enacted practices aligned with Constructivism. It was then important then to re-review the data to search for any contradictions. One of these was the teacher's use of body language. For example, greeting children at the classroom doors and positioning themselves around the classroom during inputs rather than 'at the front' – and using wireless technology to

facilitate this. There are different potential interpretations of this. Those behaviours could be symptomatic of the teacher conveying to the children that they co-owned the space – a view supported by the teacher's explanation that:

> "the room is geared up towards the children, so that you feel like the children own the space, they can self-resource, they can access their own tools, at any point" (Extract 23: T1-1d,21.05)

However, the behaviours could alternatively be considered as the teacher wishing to exert dominance and monitor children's activities. For example, observation notes had been taken about the teacher's limb positioning; with many occasions of hands on hips or other similar 'power poses' (Carney, Cuddy and Yap, 2010) inferring authority and dominance (e.g. Obs.3, 1.19). This suggested that whilst the teacher espoused that they wanted the children to feel secure and focus on learning (T1-1b, 26.14) the body language used within enacted practice suggested that they also wanted the children to be clear about the teacher being the authority figure leading that environment. This was alluded to by the teacher when they said that:

> "I still like to have an element of control where I… I like to know who's where, because my level of questioning will change depending on what's happening in the room" (Extract 24: T1-2a, 32.04)

Whilst addressed across the case in Section 4.4.4, these findings also illustrate where enacted practice data appeared to conflict with findings from espoused data. These conflicts highlight the role of subconscious actions – whether verbal or non-verbal (Mandal, 2014), thus illustrate the importance of not accepting data about teacher's practice at face value. The teacher perhaps recognises this themselves:

> "you do get some teachers and from the minute they come in everyone wants to learn because they are excited about what is going to happen. But equally you do get teachers that are more… you are going to achieve this, and this is how you are going to do it… the strategies they might use look very similar, but they still are very much, are the ones in control." (Extract 25: T1-1d, 10.12)

For this teacher, their emphasis was on targeted dialogue within the classroom. This could be seen through their encouraging of children's dialogue with each other, as well as their own focus on the role of questioning. Viewed cumulatively this suggested that it was more likely that their enacted practices aligned with Constructivism – supporting the findings of RQ1a and RQ1b which also found this teacher to align with Constructivism.

4.3.4 Responding to RQ1

RQ1 asks "what is the teacher's pedagogical stance?", and the findings outlined in 4.3.1-4.3.3 suggest that Teacher 1's espoused, intended and enacted pedagogical stances align with Constructivism. Furthermore, findings also highlight some nuances within the

data - that the teacher frames their pedagogical stance around the teacher and teaching rather than the learner and learning. For example, the teacher described their post-lesson marking of children's work and how they would begin the next lesson by seating children with the same misconceptions together (T1-3,0:00). Probing deeper, the emphasis was on teacher questioning rather than children's collaboration or dialogue (T1-3a,1.48). The focus on the benefit to teaching rather than learning is not interpreted as a Behaviourist process benefit (i.e. the teacher as holder of knowledge), nor a Sociocultural one (i.e. encouraging agency between groups of children in their learning), but as an enabler of Constructivism (i.e. capacity redirected towards additional targeted scaffolding). If the teacher had framed this as centering around the learner (rather than teacher) it would have articulated that same action instead as an agentive and self-directed formative assessment process (e.g. teaching children to self-assess through use of metacognitive approaches (i.e. skills which are known to make the greatest difference to children's progress (Hattie, 2019))).

This distinction - focusing on the teacher rather than the learner – is most visible when the teacher discusses learners' needs and framing of their independence being short term; within a lesson or sequence of lessons – reinforced by the teacher's comments about lack of interest in 'beyond-classroom' matters (i.e. convincingly ruling out Sociocultural alignment). The long-term interests were instead focused upon the teacher's own self-improvement (e.g. their high levels of reflection on and in action).

Finally, there were two findings that were surfaced during the process of responding to RQ1 that later become relevant in the discussion of how RQ1 contributes to RQ3:

- Surface level practice can appear to reflect one kind of pedagogy, but deeper probing can reveal that it is enacting another kind of pedagogy
- The way in which a teacher talks about themselves and their role as a teacher can be equally as insightful as the literal word spoken, and sometimes also contradictory

4.3.5 Responding to RQ2

RQ2 asks how the teacher uses ICT in their teaching by considering it in two ways. First their observed enacted practice and what it reveals about their uses of ICT (RQ2a), and then by probing what they say about using ICT in teaching practice (RQ2b).

For Teacher 1 an example from the summary table of their use of ICT in observed teaching practice can be seen in Figure 4.4. The summaries seen in the second column describe actions (e.g. Use of the video app SeeSaw to enable a small group to set off on a task independently from the teacher, T1, Obs. 1.1.7).

Figure 4.4: Extract from list of signposts to the uses of ICT in observed teaching practices of Case 1

Obs. Ref.	Use of ICT in observed enacted teaching practice	Category	Related interview data
Obs.1, 1.7	Use of See Saw and then iPad and Iris - to enable a small group to set off on a task independently from the teacher.	Making additional resources and opportunities available	"the kit that you can see in here… there's an iPad here that is going to be recording what is happening in this group… And the reason it's going to be recording what's happening in that group is because I know they're at a certain point in their learning and actually from the minute I've introduced what we're doing today they can get on with Construct 2… The rest of them are going to need some input to Construct 1. They're going to need some some real Direct Teaching before they can begin. So it means that that group [gesturing to iPad setup area] can get straight into their learning and pushing on whilst the rest of them have me as their focus." (T1-2a, 0.05)
Obs.1, 1.8	Use of iPad and IRIS - to enable teacher to listen back to children's dialogue, better understanding their learning, and better planning for the next lesson	Enabling more precise feedback	"So the ipad here is a piece of kit that I use called Iris, which you know about, you're familiar with and sometimes I'm using it is to capture what is going on for a particular group that I can't be focused on at a particular time. So I want to hear their conversations afterwards, so later on this evening I will play it back and listen to what their language was like, what they were saying and what connections they were making which will enable me to do something tomorrow that will move them to the next step. So that's how that works." (T1-2a, 2.25)

Using the process outlined in Section 3.8.2, these uses were described and categorised in order to surface trends about ICT practices. For Teacher 1 the trends were that ICT in observed teaching practice were:

- used to replicate processes and procedures that for this teacher would otherwise be dependent on the teacher's capacity. For example, repeating instructions (Obs1,1.13,2.2), giving feedback (Obs.1,1.9)
- determined by the teacher; what could be accessed and used, when, and for what purpose. For example, assigned time to review SeeSaw feedback (1,1.7), and QR code linked films within lesson activity time (Obs.1,1.13)
- directly linked to specific curriculum objectives. For example, instruction about how to calculate percentages (Obs.1,1.7), targeted reading at a pace of 55wpm pace (Obs.2,1.4), audio-visual model text showing vocabulary about friendship, (Obs.3,1.24)

RQ2a asks what observation of the teacher's practice reveals about their uses of ICT. The trends seen above reveal the teacher's implicit Constructivism. In addition to which the teacher's uses of ICT were framed around the role of the teacher – being used to increase teacher capacity, with parameters determined by the teacher, and specifically linked to teaching (rather than learning) objectives. This finding was probed as part of RQ2b below and discussed in relation to RQ3 in Chapter 5.

In addressing RQ2b (What did the teacher say about using ICT in their teaching practice?), interview data was probed specific to the findings from RQ2a. For example, the teacher described children using QR codes to enable them to choose to access a teacher-made instructional video hosted on the school YouTube channel:

> "let's say you were really struggling… what you could do as a child, when you think oh no I've really not got it and you've got your partner and your partner isn't being

> any help you could go over there, you could grab the QR code, we've got QR readers on the laptops, they could literally put it against there and then sit and watch whatever it is. It gives them complete independence." (Extract 26: T1-2a, 11.05)

The teacher focused on ICT enabling children's independence. Certainly, the description of the preparation of the resources and by the child in their identification and use of these opportunities, initially aligned with this positioning. However, independence is not a binary term, but a relative one (Oxford University Press, 2017). Semantically, independence is *from* something which ties the idea of independence to someone or something else; in this case the teacher.

Probing this area of the data surfaced the possibility that the teacher was not referring to the child's independence in terms of managing their own learning or experiences (for which no further data was present – as discussed in RQ1 above), but an independence that removed their demand on the teacher's capacity. This precision is important as it illustrates an example of the relationship between the teacher's pedagogical stance and the role of ICT – discussed in Chapter 5. This can be seen in many other areas of the data, for example when the teacher talks about provision for higher attaining children:

> "At Greater Depth… I'm going to make a little video, and a QR code so when those children reach that point, they can be independent of me and they can access that." (Extract 27: T1-2a, 29.07)

Given that the dataset features the teacher's emphasis on enabling children's independence, this nuance about the independence being from the teacher becomes very important when considering the impact of their ICT choices. For example, the teacher spoke about a discussion that they had with the children seeking their feedback on the use of the instructional videos:

> "they said it's like having another you in the classroom… it really is… they can't ask questions of it like they would it if were a human, but if it's just the explanation that they need" (Extract 28: T1-3a, 9.28)

The focus on enabling children to be more independent from the teacher could be interpreted in two ways; with the teacher wishing to reduce the burden upon them (i.e. a transactional focus on workload reduction), or as means to create additional capacity which can be used for other purposes. It is more likely to be the latter which this teacher was focused upon. This is because the preparation and creation of the ICT resources increased teacher workload, even if they were one-off investments (e.g. videos that could be reused in multiple lessons). The teacher was therefore not trying to reduce their overall workload, but to use the ICT to create additional capacity within class time. That capacity then enabled the teacher to provide targeted intervention to children on the basis of

responsive teaching; adding value by working with children specifically to move them on (T1-2a,12.57).

The other way in which this teacher spoke about ICT in teaching practice was where the teacher talked about how they engaged with technologies:

> "every time we look at a new app it takes me probably a little bit longer than most people just to embrace it and just get to grips with the process behind it" (Extract 29: T1-1a, 1.02)

This teacher explained their context to this view:

> "to get to grips with technology… for me it's been quite a steep learning curve" (Extract 30: T1-1a, 0.20)

This teacher talks about their relationship with ICT through comparisons between their uses and those of others. This illustrates the importance of considering Framing theory (Nelson, Oxley and Clawson, 1997) when interpreting such data. For example:

> "If the IT goes down, they are well and truly scuppered because they genuinely panic. They really panic. They don't know what to do". (Extract 31: T1-2a, 22.00)

Centering Theory (Walker, Joshi and Prince, 1998) would suggest that Teacher 1 is distancing themselves from the issue by referring to 'they' rather than 'we'. The teacher expands upon this:

> "I do think there are two levels of confidence. There's one [where] teachers who have been teaching a while and feel confident in their abilities to teach, that think yeah, I'm ok with that I can cope with that. And then there's the people who are very confident with IT." (Extract 32: T1-2a, 31.18)

At surface level this can be seen as just a comparison about confidence with using IT. But drawing again on the teacher's use of pronouns, it is possible that this teacher is seeking to distance themselves from 'the people who are confident with IT' because of the suggestion that they are not as confident (or capable) in their abilities to teach. The most plausible interpretation is therefore that Teacher 1 recognises that they are less confident with IT but doesn't see this as an issue because they are more confident with their wider teaching. Furthermore, that to this teacher, IT is seen as a servant to teaching. Ironically, the use of ICT by Teacher 1 was more sophisticated both technologically and pedagogically than many teachers that this researcher has observed professionally, yet the teacher seemed unaware of their ICT expertise.

There was nothing in the data that referred to expectations set out by the headteacher about what ICT teachers were expected to use or how they were expected to use it. However, there were expectations about focusing on the needs of the children in each class (HT1,13.42). Teacher 1 interpreted this focus on children's needs as predominantly academic needs (e.g. expressing disinterest in playground activity, T1-1b, 33.18) and

continually referred to Assessment for Learning throughout both interview and observation (e.g. T1-1c,2.32, T1-1d,4.14,13.41). The nature of ICT that the teacher embraced was similarly aligned; instructional videos that were made specifically to provide next step instruction to children (T1-2a,11.06), apps that enabled targeted feedback (T1-2a,3.05), and recordings that enabled the teacher to improve the precision of teaching in light of children's existing understanding (T1-2a,1.35).

Furthermore, when the teacher was asked about the impact of their instructional films they referred first to classroom use (as detailed in Section 4.3.1, with impact seen as independence from the teacher in class time), but also in a second way; the number of hits – focusing on quantitative consumption (T1-2a,5.39). Whilst the framing of the films by the teacher was at surface level about children's independence (T1-2a,32.04), the impact was described through consumption of teacher instruction. Notably, there was no reference to whether the instruction was understood and impacted on quality of learning or whether learning about that particular subject matter was improved as a result. The framing was instead about capacity to re-wind the teacher (T1-1d,6.58), access independently (T1-2a,29.07) and instructional consistency (T1-2a,8.59).

4.3.6 Summary

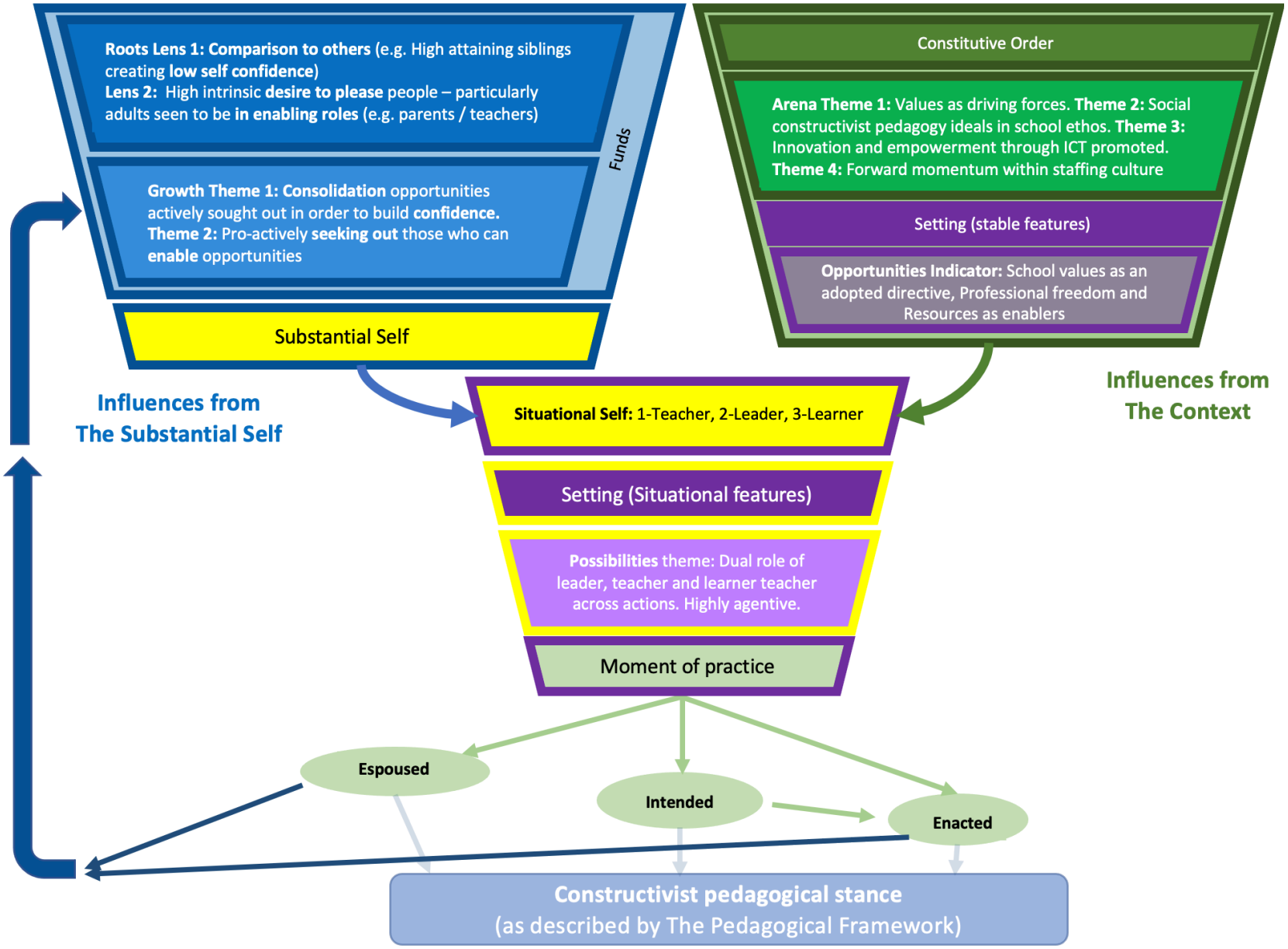
Findings from RQ1 set out that Teacher 1 had a Constructivist pedagogical stance that was centred around the teacher. Furthermore, findings from RQ2 set out that their ICT uses reflected this stance with a specific focus on instruction and assessment. However, there were subtleties within the dataset that suggested something deeper. For example, the framing of the teacher's talk about ICT being through relative terms (i.e. their comparison with peers) and the focus on using technology to facilitate independence from the teacher. These will be further discussed in Chapter 5.

Findings for Case 1 above are proportionally longer than those set out for other cases in order to illustrate some of the analysis and detailed probing. Shorter findings sections for Cases 2 and 3 now follow.

4.4 Case 2

Case 2 also centred around an established teacher who combined senior leadership responsibilities with teaching intervention groups. Detailed information about Case 2 is provided in Section 3.4 and Table 3.2. Figure 4.5 shows a personal Funnels of Influences for Teacher 2, reflecting the notable or recurring themes across the Teacher 2 dataset.

Figure 4.5: Teacher 2 personal Funnels of Influence



For example, on the left of the diagram in mid blue are the Growth themes, one of which being Growth Theme 1 – where consolidation opportunities were actively sought out in order to build confidence:

> "I took a year out and did two terms working in schools, and I went from Year R all the way to Year 6 with about 3 weeks in each of them… it gave me a huge boost of self-esteem and confidence going into my degree" (Extract 33: T2-1, 15.04)

Data generated as a result of using the Funnels of Influence aided the interpretation of data generated for each research question and illustrations are embedded throughout the findings.

4.4.1 Responding to RQ1a

Teacher 2 did not state explicitly what they believed their pedagogical stance to be. Therefore, a number of aspects of the data were probed to surface possibilities. These included the use of language, the way in which the teacher described teachers and learners, and the focal points when they discussed teaching and learning. Each of these are set out below.

The use of language and positioning used by Teacher 2 when they described the role of a teacher was revealing about what their pedagogical stance may be:

> "so many things, putting it into one succinct sentence is almost impossible… it's a guide through any sort of journey… whether it's a particular learning journey or developing their emotional intelligence… supporting learning behaviours… resilience… just being someone that is there for them… you are almost a sort of secondary parental figure for them aren't you… during the day you are that role model… there to be a listening ear…" (Extract 34: T2-3, 13.30)

The vocabulary was important – with the teacher choosing words and phrases such as 'role model' and 'guide' with undertones of expertise and leading by example which align with TPF descriptors of Constructivism. Other phrases used included 'supporting', 'there for them' and 'listening' with undertones of responsive action and care. Both suggest a stance where actions and directions are not pre-determined (thus may align with Sociocultural views) but dependent on the specific context and circumstances of the teacher/child interaction which could suggest either Constructivist or Sociocultural alignment.

Teacher 2 provided further insights into what their espoused pedagogical stance might be in their explanation of what they felt were indicators of a good lesson:

> "the children are doing the thinking it isn't the teacher - they will scaffold but the children will develop... it's not the teacher doing it all for them… encouraging and refining the children's ideas… actually you are learning from each other's ideas... developing those... if I was going into a lesson I'd want the whole environment to

> be used - that the classroom has got working walls that they have got ideas on… I'd like to see children working independently and collaboratively… engaged and motivated... different scaffolds in place for children, so that they can all join in on the same learning... (Extract 35: T2-3, 8.19)

Within Extract 35 above there are some important contradictions within the phrasing. For example, the teacher talks about 'going into a lesson', which might reflect their identity as a school leader observing other teacher's practice rather than framing their response about their own teaching practice. However, that distancing – where the teacher refers to someone else carrying out the ideal practices rather than themselves, could also suggest the teacher recognised that their espoused view is more ideological than their own enacted practices. This makes it problematic to extract the teacher's espoused pedagogical stance; distinguishing between their ideological espousal and their self-reflective espousal. Fortunately, further data where the teacher describes a poor lesson helps to shed light on this:

> "one with just the teacher talking for the majority of the time… them being at the front of the class… children not being engaged or exciting about their learning which would be sad… and then if children haven't actually moved on in their learning by the end of the lesson then um and if they haven't changed from the start, or if they have developed more misconceptions than they had at the start." (Extract 36: T2-3, 10.10)

The common elements that appear in these extracts and across the dataset for this teacher are the espoused emphases on:

- the teacher moving the children's learning on through scaffolding – often with the emphasis on the role of dialogue
- children's ideas and interests being incorporated
- the role of the teacher as supporting children rather than a focus on behaviour and authority.

Comparing these emphases to TPF descriptors, there are some important nuances. For example, whilst children's ideas and interests are taken into account by the teacher – which could suggest Sociocultural alignment - the learning experiences are not constructed around the learner but around the subject matter. Furthermore, the learning has been pre-determined by the teacher - influenced by a combination of both the school Arena and their own Growth experiences. Both of these align with TPF descriptors for Constructivism.

Throughout this teacher's dataset there is an emphasis on the role of social interaction between teacher and learner, with the specific needs of the learner being addressed

through dialogue. For example, when the teacher spoke about their approach to interacting with higher attaining children:

> "it's more about… is that the best choice that you could have used at that point… let's play around with that, let's evaluate that, and which one is the best example that you can come up with, I'd be getting them to be a lot more evaluative in their thinking so the conversations would be a lot more challenging." (Extract 37: T2-1, 17.04)

Furthermore, that for this teacher the needs of the learner tend to be beyond short-term lesson or academic needs. For example:

> "it's just learning to learn, learning to get better, learning that you can do it as well… not necessarily one goal, but just generally… improving all the time." (Extract 38: T2-1, 13.10)

and

> "I think that um as a teacher that's what you want to model all the time for the children that you can be risk taking… you might say I want to try this today; I don't know if it will work or will be… and that's what I do…" (Extract 39: T2-1, 29.56)

Alongside those views, the teacher was explicit about their relationship with learners:

> "I really care about them… whether it's to do with their learning or their self-esteem or anything that's going on in their lives, that matters…" (Extract 40: T3-1, 23.40)

Particularly in light of their role as out-of-class leader:

> "I'm still working with children all the time and still have those precious bonds with them it's just a slightly wider field." (Extract 41: T3-1, 25.32)

As described in Section 3.8.1, pronoun use can be revealing about how the speaker perceives themselves in relation to the subject matter they are speaking about, and for this teacher there is consistency in their use of "I" throughout the dataset. This is important when probing how the teacher talks about specific aspects of pedagogical stance because the use of "I" reflects a commitment to the spoken word; aligning oneself completely with what is being said (Walker, Joshi and Prince, 1998). In other words, it is less about ideology and more about lived experiences – this can be seen in Extracts 39-41 above.

Alongside the extracts above, further espoused data – which initially appears unrelated to drawing out pedagogical stance - can be highly revealing. For example, when the teacher described the school that they were working in:

> "[The school value of innovation means] teaching the children to be innovative and come up with new ideas and being creative and thinking outside of the box, and making learning itself innovative… like the wipe board walls which we've got – that was a research project I did in my NQT year…" (Extract 42: T2-1, 0.42)

The syntax and pronouns used in Extract 42 were important in extracting meaning. What started as a description about the school became exemplified through an example of the teacher's own previous practice. That could reflect an egocentric perspective from the teacher; whereby they only see the relevance of the school values if and when they contribute to their own actions. However, other data refutes that idea. Elsewhere in the interviews the teacher spoke about the wipeboard walls project alluded to here, as one where a successful trial in their classroom had been enthusiastically adopted by other teachers and eventually all classrooms had adopted the initiative (T2-3,8.18). Theory around Dialogic Overtones (as introduced in Section 3.7.3), in Extract 42 would suggest therefore that instead of describing 'the school' which is how the extract initially appears, the teacher is describing themselves as having something to offer both the children within their own class as well as the wider school community – including other professionals – highlighting their sense of belonging to, and contributing to, the social community. In turn, this illuminates another aspect of the teacher's pedagogical stance; that they see themselves as facilitator of learning for both children and other adults, but also as a learner themselves within and beyond the school environment. This focus on broader social matters affecting learning suggests alignment with Behaviourism to be unlikely. This was supported by other data where the teacher spoke about their enthusiasm for engaging in professional working groups (T2-1,18.38), finding ideas on Twitter and discussing them with colleagues (T2-1,20.04), their own professional development and career progression so far (T2-1,25.32), and how they interacted with others across the school community (T2-1,20.48). The sentiment within these data highlighted the teacher's view of knowledge as being socially acquired which could suggest either Constructivist or Sociocultural alignment. However, TPF descriptors make a distinction between knowledge being constructed and a property of the individual to transfer across situations (TPF, View of knowledge, Constructivist), and knowledge being situated and thus emerging and shared by those within situated action (TPF, View of knowledge, Sociocultural). This suggests that Teacher 2 may align more with Constructivism.

Findings above lead to a hypothesis that Teacher 2 aligns most convincingly with TPF descriptors of Constructivism. However, whilst there were no convincing elements of Behaviourism, there were aspects of the teacher's dataset which suggested possible Sociocultural alignment. For example, when the teacher spoke about their role as a school leader:

> "**we** just had an LLT meeting this morning and [name] who is year 4 leader was just sharing these ideas about how to support children with gaps and coming up with new ideas and everyone was yeah let's have a look and **me** and [name] are going to meet and explore that further…**I** like how many people we have got to work on, how are **we** going to solve this problem… there is such a range of people

to draw on and get ideas and expertise" (Extract 43: T2-1, 18.38). *Note: **bold** text relates to what now follows, rather than reflecting speaker emphasis.*

The teacher's description of this situation highlighted the fluidity between how they recognised themselves as a leader within the school, yet their identity as a learner (e.g. "people to draw on and get ideas and expertise") and as part of a peer community (e.g. "how are **we** going to solve this problem") were present.

Furthermore, the framing of the explanation is revealing – whilst Teacher 2 was the senior leader in the example above, they positioned themselves as working alongside the Year 4 teacher rather than supporting a junior colleague. This could reflect a lack of confidence or leadership authority on the part of Teacher 2, but data elsewhere suggests this is unlikely – with Teacher 2 tending to use pronouns that infer collegiality throughout:

> "the idea of responsive teaching… so that **we** are not planning ahead blindly… **we** are trying to think of what is the learning specific to this lesson? What potential misconceptions might come up… and then altering your planning going forward from that" (Extract 44: T2-3, 5.01)

Extracts 43 and 44 suggest that the teacher sees dialogue as the way to draw out meaning, and that meaning becomes part of a process that solves a pre-determined problem – supporting earlier findings that suggest a Constructivist (rather than Sociocultural) view on knowledge. Furthermore, Centering Theory suggests that the use of pronouns (we and I, rather than they/their) as seen in the examples above reflects the speakers sense of implicit belief within the dialogue rather than a repeated espoused response (Walker, Joshi and Prince, 1998).

To conclude the findings for Teacher 2 for RQ1a, both the literal and implicit meaning within discourse surface a care and consideration of learner's holistic needs and that the teacher's identities of leader, teacher and learner are interwoven. This meant that some aspects of the data could be interpreted as potentially aligning with either Constructivism or Socioculturalism. However, espousal across the dataset reveals that those learner needs are addressed within the parameters of subject-oriented learning opportunities, structured activities and teacher-led scaffolding – through dialogue and practical actions. This is in part due to school Arena influences and practical parameters (which a Sociocultural alignment would allow for), but predominantly because of the way in which the teacher sees themselves as central to the enabling of others through scaffolding, dialogue, encouragement and support. The way in which the support is positioned – with teacher scaffolding at the heart - suggests that the teacher sees learners through a slightly deficit model in terms of contributions which rules out Sociocultural alignment (which would be dependent on mutuality – the learner's contributions being equally

important as those from the teacher). In terms of their espoused pedagogical stance, Teacher 2 therefore most convincingly aligns with Constructivism.

4.4.2 Responding to RQ1b

RQ1b asks what the teacher's intended pedagogical stance was. Previous findings were used to probe whether the teacher's intentions aligned or challenged the hypothesis that their implicit pedagogical stance was constructivist. This was achieved using the processes set out in Section 3.8.2.

Within the dataset for Teacher 2, 65 intentions were identified, and these were grouped into 17 summary categories as seen in Figure 4.6.

Figure 4.6: Summary of Intended practice within Teacher 2 dataset

Category	Summary of Intention	Examples of this Intention within dataset
1	Considering cultural, social or emotional aspects of children's experiences	(e.g. T2-2 ,2.22, 11.12, 5.30, T2-3, 12.02)
2	Considering cultural aspects of children's experiences and the role of technology within these	(e.g. T2-2, 0.19, 1.38, 5.02)
3	Enabling more socially oriented teaching and learning interactions, with and without technology	(e.g. T2-1, 6.59, T2-2, 3.45)
4	Nurturing others	(e.g. T2-1, 1.33)
5	Considering children's individual needs	(e.g. T2-2, 7.44, T2-3, 8.19, 13.30)
6	Reacting to childhood experiences of teachers by providing child-centred planning, interactions and relationship nurturing	(e.g. T2-1, 14.21, 20.04, 23.40)
7	To adjust interactions, planning, vocabulary and guidance to ensure working just beyond what children could do independently; *paraphrasing in their zone of proximal development*	(e.g. T2-2, 7.05, 8.52, T2.3, 0.26, 5.55, 6.01, 7.22, 17.04)
8	Replicating childhood experiences by providing support and encouragement	(e.g. T2-1, 11.59)
9	Access to more knowledgeable others	(e.g. T2-1, 18.38, 19.48)
10	Self improvement and aspirations for improving practice	(e.g. T2-1, 1.57, 6.59, 13.10, 15.23, 24.58, 25.32, 28.00, 29.01, 29.56, T2-3, 15.26, 18.55)
11	To please others – to be told well done, or to avoid upsetting people	(e.g. T2-1, 10.08, 11.11, 20.48, T2-3, 14.42)
12	Embracing the school ethos values	(e.g. T2-1, 0.17, 4.37)
13	Innovation through practice, with and without technology	(e.g. T2-1, 0.42, T2-3, 21.30)
14	Making learning purposeful and exciting – for others	(e.g. T2-1, 2.13, 3.45, 4.47, 5.56, 8.08, 13.10, 17.02)
15	Making learning purposeful and exciting – for self	(e.g. T2-1, 9.40)
16	Pre-empting disruptions in order to avoid losing learning time	(e.g. T2-2, 2.56)
17	Technology use to increase teacher capacity or manage logistics	(e.g. T2-2, 2.04, 4.26)

Intentions within practice were unpacked in order to understand the teacher's intentions. For example, Teacher 2 spoke about a child that they were working with who they perceived as being dependent upon the teacher directing each stage of their learning (T2-

3, 0.26). The teacher talked about providing scaffolds in order that the child would gradually become more confident in taking ownership for their own learning. This kind of intention could initially be interpreted as centered around the needs of the learner – suggesting possible sociocultural alignment. However, the teacher was doing so in such a way as to scaffold the child towards pre-determined actions and outcomes which means that sociocultural alignment is unlikely. The teacher's focus was on the learner's zone of proximal development – a strong indicator of Constructivism. Figure 4.7 reflects how this example has been mapped to the TPF descriptors. The top two rows set out data highlighting the Intention on the left, and a summary of that intention on the right. The lower three rows draw out key features from the example (e.g. The teacher is modelling), on the left, and the TPF descriptors these most align with on the right.

Figure 4.7: Mapping of RQ1b intended practice group to TPF descriptors

Examples of this Intention within dataset	**Summary of Intention**
(e.g. T2-3, 0.26); "I had [child's name] last week and I was very much into structuring - you know at the start I modelled a sentence and I got them to do it, and I was doing that almost the whole way through the paragraph, all the way through constantly... so they are beginning to apply the skills more independently now... I'm trying to get them to take that ownership for reading back to read through their work checking for themselves"	To adjust interactions, planning, vocabulary and guidance to ensure working just beyond what children could do independently; *paraphrasing in their zone of proximal development*
How it maps	**Mapped to the TPF descriptors**
The teacher is modelling ; reflecting authority, in order to scaffold learning towards an established 'right'.	"Teachers are the authority in scaffolding learning to achieve established knowledge claims". **(Views of the teacher and teaching, Constructivism)**
The teacher is directing the child/ren to undertake their writing in specific and pre-determined ways, and is scaffolding children in working towards being stand-alone competence/independence in doing so for themselves.	Teachers do not guide but actively direct experience through scaffolding and the dialogue between children until they achieve stand-alone competence in conceptual understanding and subject specific problem solving or ways of doing. Teachers direct learning through the zone of proximal development. **(Views of the teacher and teaching, Constructivism)**

This unpacking took place for each of the intentions which meant that the 17 categories of intentions could then be mapped to The Pedagogical Framework (see example in Figure 4.8). This was not about mapping individual extracts but about ensuring that when reviewing the categories, detail within the data that had led to those categories was borne in mind; surfacing the dialogic overtones.

Figure 4.8: Mapping of Teacher 2 intentions to TPF descriptions

Category	Summary of Intention	Mapping to The Pedagogy Framework
1	Considering cultural, social or emotional aspects of children's experiences	"Learning occurs in dialogue with others in activity. It is through dialogue that meanings emerge between people. Dialogue relies on collaboration between learners and learners and teachers actively establish joint contingency." (**Views of learner and learning, Constructivism**), **ALSO**, "Teachers do not guide but actively direct experience through scaffolding and the dialogue between children until they achieve stand-alone competence in conceptual understanding and subject specific problem solving or ways of doing. Teachers direct learning through the zone of proximal development." (**Views of the teacher and teaching, Constructivism**)
2	Considering cultural aspects of children's experiences and the role of technology within these	
3	Enabling more socially oriented teaching and learning interactions, with and without technology	
4	Nurturing others	
5	Considering children's individual needs	
6	Reacting to childhood experiences of teachers by providing child-centred planning, interactions and relationship nurturing	
7	To adjust interactions, planning, vocabulary and guidance to ensure working just beyond what children could do independently; *paraphrasing in their zone of proximal development*	
9	Access to more knowledgeable others	
8	Replicating childhood experiences by providing support and encouragement	
16	Pre-empting disruptions in order to avoid losing learning time	
14	Making learning purposeful and exciting – for others	
10	Self improvement and aspirations for improving practice	"Motivation is intrinsic but it is to understand how others in society have constructed ways of seeing and understanding the world that provide the learner with power to be selfdetermined, make informed and socially aware decisions and be socially responsible - a literate citizen". (**Views of learner and learning, Constructivism**)
11	To please others – to be told well done, or to avoid upsetting people	
13	Innovation through practice, with and without technology	
15	Making learning purposeful and exciting – for self	
17	Technology use to increase teacher capacity or manage logistics	"Teachers are the authority in scaffolding learning to achieve established knowledge claims". (**Views of the teacher and teaching, Constructivism**) ALSO "Knowledge is abstracted and available for transfer across situations" (**Views of knowledge, Constructivism**)
12	Embracing the school ethos values	Does not map to a specific model of pedagogy on The Pedagogical Framework

For Teacher 2 all of the intentions aligned convincingly with Constructivism. Probing into specific examples drew out key emphases which affected the interpretation. For example, the teacher often talked about scaffolding (e.g. T2-3,8.19, T2-3,17.04). Whilst this term is associated with Constructivism, caution must be exercised when assuming shared meaning by its use. At surface level the frequent reference to scaffolding could be interpreted as the teacher providing pre-determined differentiation, activity styles or tasks that enable children with different learning needs to access the same learning intentions; moving them on specific to their individual needs. However, this is also an example of how probing data elsewhere, both explicitly and through dialogic overtones, surfaces greater meaning. For example, when they explained the meaning behind their use of the word scaffolding in the context of a writing task:

> "is that the best choice that you could have used at that point... which one is the best example that you can come up with… how does it affect the reader… getting them to be a lot more evaluative in their thinking" (Extract 45: T2-1, 17.04)

This teacher looked beyond scaffolds as a means to access learning and saw scaffolding as taking place through exchange of ideas and evaluation skills.

The data set out above reflects how each category of intention aligned with a model of pedagogy from The Pedagogical Framework. For Teacher 2 this mirrored the findings of RQ1a as being most aligned with Constructivism. As illustrated above, there was also compelling evidence that their Constructivist intentions were framed around the needs of learners rather than the teacher.

4.4.3 Responding to RQ1c

The purpose of RQ1c was to identify how the teacher's observed enacted practices aligned with the models of pedagogy set out by The Pedagogical Framework.

Teacher 2 was observed on two occasions, each with Year 6 intervention groups taking place in one of two intervention classrooms which the children were familiar with (T2-2,10.58). The first observation was a structured writing lesson and the second was a maths lesson. Section 3.6.5 set out how observation data was generated, Appendix I contains the observation guide setting out what the focus areas were, Section 3.7.4 explains how observation data was processed, Appendix P contains vignettes for each lesson observed and Section 3.8.3 set out how observation data was analysed.

Key pedagogical features were identified from across the observation data.

Table 4.3: Mapping of observed features of teacher's practice, with TPF descriptors

Focus area	Features across observations	Mapping to The Pedagogy Framework
Inputs	these set out the intentions for the lesson, how the lesson related to previous attainment or output and what the purpose of the learning was (Obs.1, 1.13, 1.31, 1.32, Obs. 2, 2.8, 2.9)	"Teachers are the authority in scaffolding learning to achieve established knowledge claims" **(Constructivist, Views of teachers and teaching).** "Knowledge is constructed it doesn't represent an objective external reality" **(Constructivist, Views of knowledge)**
Activities	these were designed to meet the needs of specific children, with some in a focus group with the teacher, and some working independently of the group, based upon previous attainment and projected needs (Obs.1, 1.22, 1.25). Children were provided with access to resources which would aid their activities dependent on assessment of their existing capabilities (Obs.1, 1.26).	"Teachers elicit children's prior knowledge and model learners' knowledge through process of testing and retesting. They provide contingent guidance moving individual learning towards specified curriculum goals." (Constructivist, Views of teachers and teaching)
Language	the teacher language was gentle and encouraging (Obs.) and took into account children's ideas and contributions (Obs.1, 1.33). The teacher framed questions and feedback to infer collaborative learning using phrases such as "when we use… the effect it creates is…" (Obs.1.35) and "what do we know and what do we do first" (Obs.2, 2.17). Similarly, "why don't you try it, and see if you get an answer that you think is realistic?" (Obs. 2, 2.27). Children were praised for their contributions and also for their perseverance and effort (Obs.1, 1.33).	"Learning occurs in dialogue with others in activity. It is through dialogue that meanings emerge between people." **(Constructivist, Views of learner and learning)**
Relationships	the teacher appeared to utilise knowledge about of how different tasks and challenges would affect the emotional mindset of different children in the class, such as "I'm just going to show off for [child's name] here [read work aloud] and used…" which had a noticeable effect of motivating a nearby child who then asked if they could share their work (Obs.1, 1.34), and when a child asked 'can you help me' the teacher replied "How can I help you, or How can you help yourself?" (Obs.1, 1.35). Similarly "what might the person looking at that work think that you mean?" (Obs. 2, 2.25)	

These can be seen in Table 4.3 above (Note: RQ2 below discusses the uses of ICT within observations in detail, so those are not addressed explicitly here). Using the first focus area – Inputs – data from Observation 2 can be used to illustrate these common features. For example, the teacher:

- set out the intentions for the lesson as being to close some gaps in maths learning (Obs.2,2.8)
- explained how children's prior work had been used to identify specific areas that individual children were finding tricky – resulting in a personal list for each child of specific skills to practice (Obs.2,2.9)

Each of these aligns with TPF Constructivist descriptors about teacher's eliciting prior learning, scaffolding new learning as a result of that, and working towards established knowledge claims – as reflected in the right-hand column.

Language used by the teacher within their enacted practices appeared to be intentionally chosen to convey specific messages to the children. For example, the predominance of the pronoun 'we' used by the teacher when addressing misconceptions with children inferred a shared sense of ownership on the issue (e.g. "we just need to change…" (T2, Obs.1,1.35)). This contrasted with the use of individual names or 'you' when praising successes where the teacher very precisely described the achievement. Centering Theory (Walker, Joshi and Prince, 1998), suggests that the use of 'we' when discussing misconceptions – by the teacher - conveys a sense of shared responsibility. This is likely to be an enacted reflection of the teacher's empathy with the emotional aspects of learning, and the role that the teacher plays within that (as discussed in RQ1a). This belief had been surfaced when the teacher spoke about their own formative years for the impact it had on the teacher both short and longer term:

> "I remember just feeling overwhelmed by it, I couldn't do it… my teacher didn't she didn't tell me off or anything she just came and asked me what's going on and she said right we will go through it one to one… I started going to see her more regularly outside of my lesson times and she just put in that extra bit of effort for me… that's really what I want to do for the children in return when they think they can't do it, just spend some time with them… so that they have that same kind of realisation that I did…" (Extract 46: T2-1a, 11.59)

Evidence from the teacher's enacted practices aligned with Constructivism; where the teacher held an authoritative role rather than one of mutuality, and where learning took place through collaborative dialogue rather than communities of practice. For example, Teacher 2 was seen to encourage and enable children to draw meaning out from peer dialogue (Obs.2,2.20) and collective problem solving (Obs.2,2.15). In both of those examples the teacher had noticed children identifying a problem and then encouraged their negotiating its resolution between them.

Similarly, within their observed Enacted practices, the teacher had framed much of the dialogue through the use of collective pronouns. Framing theory (Nelson, Oxley and Clawson, 1997) suggests that the nature of their language in encouraging children to explore, probe, challenge and debate ideas suggests a more equitable dynamic between teacher and children than the observed classroom environment would otherwise suggest.

4.4.4 Responding to RQ1

RQ1 asks what the teacher's pedagogical stance is, and the findings outlined above in 4.4.1-4.4.3 suggest that Teacher 2 aligned convincingly with Constructivism. However, findings drawn from espoused, intended and enacted data also highlight some nuances within the data. For example, that the teacher frames their pedagogical stance around the learner rather than the teacher. This is discussed further in Chapter 5.

4.4.5 Responding to RQ2

RQ2 asks how the teacher uses ICT in their teaching by considering it in two ways. First, their observed enacted practice and what it reveals about their uses of ICT (RQ2a), and then by probing what they say about using ICT in teaching practice (RQ2b).

For Teacher 2 an example from the summary table of their use of ICT in observed teaching practice can be seen in Figure 4.9. As categorised in the third column, and detailed in the fourth, this example reflected two intentions for the use of ICT. The first intention was to provide support for a targeted group of children to enable them to work independently whilst the teacher focused on another group. The second intention was to scaffold underperforming children in being more experimental with their use of language in their writing work (T2, Obs.1,1.24).

Figure 4.9: Extract from list of signposts to the uses of ICT in observed teaching practices of Case 2

Obs. Ref.	Enacted use of ICT	Category	Related interview data
Obs. 1, 1.24	Use of Clicker 7 software with vocabulary wordbanks, ability to draft & improve sentence construction and to review these by listening rather than reading.	Technology reducing children's dependence on teacher availability	"the other group I'm going to be modelling along with them so… um… I'll be writing, modelling, discussing the sentence structures and the impact that has on the reader, then I'll get them to use the same wordbank that's on the Clicker 7, and they can use their own ideas... it's just a little bit more structured for them because I think they need a little bit more structure from me... um... I will have some Chromebooks out so if they want to look up some words if they don't want to use the word big for example... they will be to hand so they can use it but I'm not going to focus on that with them... it's there if they need it, not there to use for every word, so hopefully they won't get too involved.." (T3-2, 9.33)
		Technology empowering children to draft and improve work, and to review this aurally	"in terms of this group of children I am not sure how much experience they have had with Clicker 7, so that could be interesting… I'm taking a bit of a risk with them… [laughs]… but it's fairly simple to use…essentially they click through the tabs [mimes doing so]... they can... if they click on the fronted adverbial then it just pops up on to there... like a Word document... [gestures] they can type in and make anything their own... and then every time they finish a sentence it will read it back to them... which means they can hear it and they can hear if it doesn't quite make grammatical sense, of if they missed a word or if it doesn't quite make sense to the reader... um... and... often I find that some children who are a bit reluctant to write it's often a little bit less scary doing it on a computer because you can delete things, change things, edit things, then commit to paper." (T3-2, 8.52)

Using the process outlined in Section 3.8.2, the full list of enacted instances of ICT (RQ2a) were described and categorised in order to surface trends about ICT practices. For Teacher 2 these trends were that ICT in observed teaching practice was:

- Designed to enable children to pace their own learning and access instruction as and when they needed it. For example, a pair of children solving BODMAS problems deciding to watch a QR linked YouTube instructional video to remind them how (Obs.2,2.2)
- Used as a tool or prompt to encourage specific learning behaviours seen as desirable by the teacher. For example, stimulating vocabulary rich descriptions through use of film (Obs.1,1.32), vocabulary focused re-reading and re-drafting (Obs.1,1.24), or group problem solving (Obs.2,2.15)
- Used to allow the teacher flexibility in where they located themselves in the classroom during the lesson – particularly during inputs and whole class discussions. For example, the teacher sitting amongst the children during a whole class input and using an IWB, wireless keyboard and mouse to enable them (Obs.1,1.32)

It was notable that the teacher's uses of ICT were framed around the role of the learner:

- Learners actively constructed knowledge together (e.g.Obs.2,1.15)
- Uses encouraged dialogue between learners and/or learner with teacher (e.g.Obs.2,2.2)
- Uses communicated meaning about what it means to learn and who was part of that learning (e.g.Obs.1,1.32)

RQ2a asks what observation of the teacher's practice reveals about their uses of ICT, and the trends seen above reveal the teacher's implicit constructivist pedagogical stance. In particular there was very strong alignment between the last bullet list above and TPF descriptors concerned with View on learner and learning, surfacing a particular emphasis on this teacher's focus on the learner rather than the focus being on the teacher. These findings were then probed as part of RQ2b. Figure 4.10 shows a extract of the summary of interview data where there was any mention of ICT.

Figure 4.10: Summary of ICT mentioned within Teacher 2 interview narrative

Int. Ref.	Time stamp	ICT within narrative (not specific to Enacted Practice)	Category
T2-1	3.45	Use of Screencast on laptops and then publishing to YouTube, and Facebook Live to record children reading their finished work as part of celebrating outcomes.	ICT as bringing purpose to, or increasing engagement with, learning
T2-1	8.08	Use of Virtual Reality headsets for children to 'go' to Iceland rather than just looking at pictures on the board - to enthuse and excite children.	
T2-2	7.05	Broader context of observed lesson that children will write their stories and then film them and edit that film into a production that is shown as a movie night with parents in attendance.	
T2-2	7.44	Use of video clips to inspire language in English lessons.	
T2-2	13.29	Use of Google Classrom to access film resources which enable Flipped Learning.	
T2-3	0.2	Video clips used to see and hear the story being used as stimuli in English writing lesson.	
T2-2	2.56	Awareness that technology goes wrong sometimes and the need to plan for that in order for it not to disrupt learning.	Importance of planning effectively for technology use
T2-2	5.02	Teacher view that technology is great when used purposefully, but shouldn't be an add-on.	
T2-1	4.04	Infrastructure available includes: 3D printer (describes various classes using it)	Infrastructure
T2-1	22.11	Use of laser cutter, radio station and laptops in everyclassroom - referenced as making creativity more achievable.	
T2-2	5.3	Teacher view that sometimes you 'just have to give it a go', taking a risk to build confidence.	Innovation requiring risk taking
T2-3	20.53	Perception of teacher's parents as not confident, but examples given include their use of YouTube to find videos to solve problems. Describes partner as not confident but examples given include spreadsheet use.	Perception of partner and parents to be average technology users
T2-2	0.19	Teacher percetion that children love technology; based on their talking about their out-of-school hours use.	Perception of children's expectations for technology use
T2-3	19.34	Personal use of Smartphone (iPhone) for Sat Nav, Social media, Google, Contacting people, Twitter, Facebook pages.	Personal use of Smartphone, Tablet and Desktop for social and cutural interactions
T2-3	20.11	Personal use of a Table - to watch tv through iPlayer and Channel 4.	
T2-3	20.11	Use of a Mac desktop, Tablet and Smartphone as only technology used in personal use.	
T2-2	5.3	Teacher view that technology could be a distraction if the learning behaviours in the classroom are not right. Trust, classroom environment, really good classroom culture are all vitally important, and the teacher's understanding in why and how the technology adds value to what is happening. These will impact on learning.	Relationship of technology with the culture within the classroom
T2-2	13.58	Children confident using Google Chromebooks as part of the culture of the classroom	
T2-3	2.22	Teacher's attention to how children engage with the technology (e.g. noting reluctance in one child to do non-technology option, and probing it to understand why and how this would affect learning that lesson).	
T2-3	2.22	Child wanting to use a laptop rather than written work so that they could 'cross out' without making their work messy.	

Following processes set out in 3.8.6, this data was categorised (seen in the far-right column in Figure 4.10). These are summarised below, separating out those which relate to pedagogical stance and in italics those which do not directly do so:

- ICT bringing purpose to, increasing engagement with, or encouraging, learning
- The importance of planning effectively for ICT use
- Innovation requiring risk taking
- Perception of children's expectations for ICT use
- Relationship of ICT with the culture within the classroom
- Social media use accessing ideas and inspiration
- ICT enabling access to things that were not otherwise possible
- ICT reducing children's dependence on the teacher's availability
- *Infrastructure available*
- *Their partner and parents being average ICT users*
- *Personal use of smartphone, tablet and desktop for social and cultural interactions*

There were contradictions within this data. For example, whilst the teacher described themselves as ‘an average’ technology user (T2-3,20.53), they had a fluidity in their narrative around ICT that inferred a level of familiarity. This can be illustrated by the way that the teacher spoke about using social media to learn about ICT use within other schools:

> “if you are on social media, there are loads of… ‘ICT with Mr P’ will come up on my News Feed and I think oh look at how they are exploring the digestive system using augmented reality that’s really exciting” (Extract 47: T2-3, 21.30)

There are many ways to interpret this kind of narrative. For example, ICT – particularly when introduced through social media channels – is known to provoke very strong yet surface-level interest in recipients, inducing ‘Fear of Missing Out’ (Alt, 2015). One possible interpretation is that this teacher was seeking to maintain a level of awareness matching that of their peers. Given that the teacher knew this study to be focusing on ICT, their framing of excitement about ICT may be an attempt to align with the study and researcher’s interests.

However, another interpretation is that the teacher is pro-actively seeking out ideas for improving their teaching practice and that they see social media as an efficient mechanism to doing this. This is alluded to by the reference made to the ways in which ICT ‘opens the doors’ (T2-3,21.30). Probing this further it is helpful to see the ‘opening doors’ reference in the context of other statements about ICT uses, because it is not initially clear ‘who’ the doors are being opened for (i.e. the teacher themselves, children, colleagues). The ambiguity about who the focus is on appears elsewhere in the data. For example:

> “I love using technology because I think it has a lot of potential to encourage…” (Extract 48: T2-2, 0.19)

The phrasing of this view was important because of two specific words chosen. First, the use of the word ‘potential’ - inferring a set of decisions that would determine whether that turned into a reality. Second, the word ‘encourage’, which was not specifically defined, but from what followed inferred nurturing and support, and the absence of the attachment to a particular learner (e.g. lower attainers). This interpretation aligned with the two overarching themes which emerged from the teacher’s ICT dataset.

First, the framing of the teacher’s discussion about ICT, and the ways that it was used in practice were centred around the role of the ICT making an impact on social, emotional or cultural aspects of learning. For example, the teacher spoke about the ways in which ICT was being used to support specific children with emotional aspects of their learning:

> “I find that some children who are a bit reluctant to write it’s often a little bit less scary doing it on a computer because you can delete things, change things, edit things.” (Extract 49: T2-2, 8.52)

Similarly, the teacher spoke about using ICT to provide experiences that children might not otherwise be able to access or draw upon:

> “If I’m trying to get them to write about Iceland, then why not use what technology has to bring them to Iceland? They can put on [VR] headsets and they can look around… it’s playing, it’s make believe… or having a huge interactive whiteboard showing a video of going up through the…” (Extract 50: T2-2, 0.19)

At first the subject of this example appeared to be the VR headsets and the teacher’s explanation about how they could be used. However, when expanding the example, rather than giving additional examples of VR headset use, the teacher instead described other ways of achieving their intention for the use - the engagement and stimulus – with the IWB. This frames the teacher’s narrative around the intended benefit of use rather than the ICT equipment itself. This surfaces the teacher’s centering around learner engagement. The teacher also spoke about using technology to provide targeted and efficient feedback or instructional input using the same framing:

> “you can take a photo of the child’s learning and then you can annotate it and voice over… they can go back and get that individualised personal feedback, and having it recorded… in a lesson they can go back and watch it again, and again, and they can go back at the end of the lesson and think have I understood.’ (Extract 51: T2-2, 4.26)

The narrative here again initially appears to be an illustration of ICT use, but the focal point for this teacher is on the child’s self-analysis and the ICT is seen as servant to that.

The second theme was a pragmatic and practical view on the challenges that using technology invokes, but importantly, not seeing these as a barrier to using it. For example;

> “you know technology goes wrong… the laptop runs out of battery… disconnection from the internet… you’re only going to get used to doing it and taking that risk by trying it” (Extract 52: T2-2, 2.56)

4.4.6 Summary

To respond to RQ2 which asks how the teacher uses ICT in their teaching, draws upon the observations discussed (RQ2a) and the teacher’s wider narrative (RQ2b). As outlined above there are many possible interpretations but the most credible draws upon the dialogic overtones throughout the data; that the teacher sees ICT as an enabler, subservient to the needs of the learner. But the kind of enabling that this teacher describes is more than about engagement, excitement and motivation. They talk of using ICT to provide meaningful stimulus (e.g.T2-3,0.20), to connect to an authentic audience

(e.g.T2-1,3.45), to remove known barriers (e.g.T2-2,7.44), to equip children with scaffolds such that tasks become more achievable (e.g.T2-2,8.52) and to seek out ideas and inspiration for continual improvement of practice (e.g.T2-3,21.30). All of the narrative surrounding ICT use within teaching practice was, for this teacher, focused on the learners and their learning. Furthermore, the ways in which ICT were used illustrated the teacher's focus on enabling, exciting, enthusing and encouraging children holistically; reaching further than an individual task, lesson or phase of schooling.

4.5 School B

As introduced in Section 3.2.4, Case 3 centres around an established teacher and was located in a fee-paying independent preparatory school for children aged 3-13 (School B). Appendix N contains a detailed overview of the school. The headteacher spoke about the way that fee-paying parents influenced the school's prioritisation of preparing children for their next school:

> "there are assessments in order to get into the next school… we have to blend our own objectives which might be idealistic… with those things that have to be practical…" (Extract 53: HT2, 0.22)

The focus on preparing children for assessments manifest itself in a number of ways. For example, when asked about the expectations of teachers working within this environment, the headteacher explained that:

> "what you are looking at is outcomes… there are so many factors that can affect that child, on that day, in that room, in that subject, with that teacher, sitting next to that other child, that… I'm expecting the teachers to adapt." (Extract 54: HT2, 33.31)

One interpretation was that the data appeared to infer the unique social, emotional, pastoral and cultural needs of each child and that teachers would be expected to be highly skilled in responding. However, the exemplification that followed by the headteacher illustrated a different perspective:

> "it's actually made very easy because we use a database, for our school information management system, and if you have got a coloured star then the child is a boarder, or the child has English as an additional language, or an educational disability." (Extract 55: HT2, 33.31)

This explanation suggested that the headteacher had a less detailed and possibly less socially oriented lens than the initial interpretation implied. This more traditional, information processing perspective was supported by their consequent explanation that:

> "They need to understand where they are heading… today we will get from A to B as part of a week when we will get from A to E" (Extract 56: HT2, 35.15)

Probing this possible interpretation - that learning was seen as an organised process - it was helpful to reflect upon the headteacher's explanation of the role that leaders played:

> "I observe, we do work scrutiny… one subject in one year group every week – all the marking… whether the work that is set is appropriate to the age of the children and the standards that they are working at, whether everything is marked… I think those things are all going towards making a lesson as it should be." (Extract 57: HT2, 37.01)

The predominance of authority was also demonstrated when the headteacher spoke about how school improvement strategies were identified and implemented:

> "we've largely decided we are going to do it, but we are going to say here's how we are going to do it, it's going to have some impact on you, we need to have some input and feedback from you." (Extract 58: HT2, 15.21)

The extract above also surfaced another consideration; that the needs and nuances of individuals were only present in the dataset as an acknowledgement rather than as a contributing factor. The headteacher talked at length about how teachers should not bring their personal beliefs into the classroom; summarising as:

> "there is a need for people to leave certain things in the changing room… I don't think it changes how a professional person does the job… I think they… you're playing a role… teachers are mostly actors…" (Extract 59: HT2, 40.29)

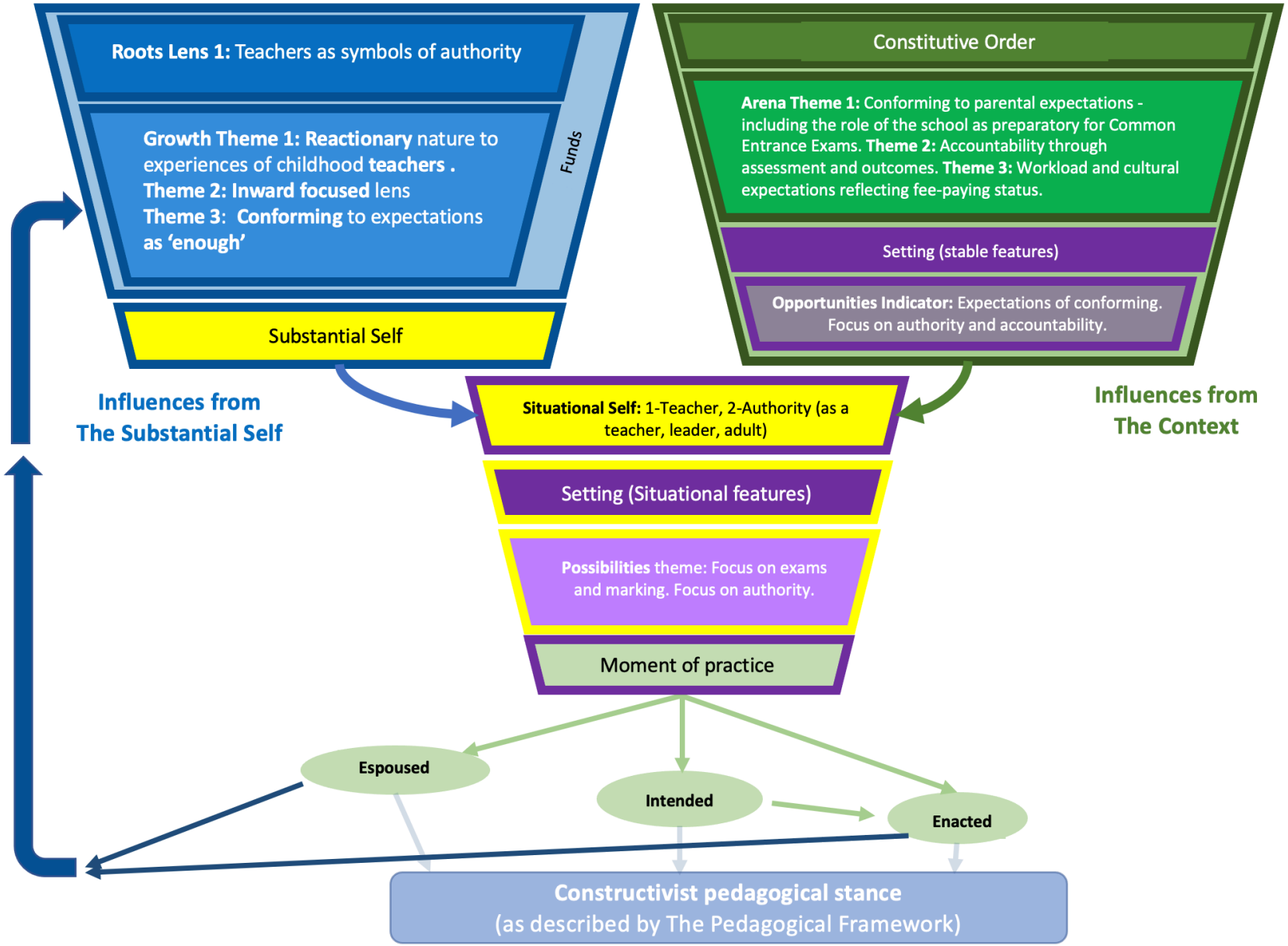
4.6 Case 3

As set out in Section 3.4 and Table 3.2, Case 3 centred around an established teacher who combined senior leadership responsibilities with classroom teaching. The 5 interviews and 3 observations spanned 3 months, and prior to this study the teacher and researcher were not known to each other.

Teacher 3 had previously taught in two state secondary schools: one for seven years; from being an NQT to becoming a senior leader responsible for school behaviour and pastoral matters. The teacher then taught in another secondary school as an Assistant Headteacher for two years before leaving due to high stress and difficult working dynamics, finally moving to School B as a middle leader. The data generation for this study took place in their second year at School B. Framing Theory (Nelson et al., 1997) suggests that the teacher appeared to distance themselves from their previous schools and practices through the way that they talked about them. Examples of this are illustrated within the findings in Sections 4.6.1-4.6.5.

Figure 4.11 shows a personal Funnels of Influences for Teacher 3, reflecting the notable or recurring themes across the case dataset.

Figure 4.11: Teacher 3 personal Funnels of Influence



As noted in Section 3.8.8 the personal Funnels are bounded and framed by the discourse and practice in this study. To illustrate, on the left of the diagram in mid blue are the Growth themes, one of which being Growth Theme 1 – a reactionary nature to experiences of childhood teachers. One of many examples of this is where the teacher spoke about a particular childhood teacher:

> "I didn't like some of the things he said to people in the classroom… he'd go around saying "you're really thick" … condescending, derogatory language like that… I would never do that… I'm very careful about what I say" (Extract 60: T3-3, 11.50)

Data generated as a result of using the Funnels of Influence, aided the interpretation of data generated for each research question and illustrations are embedded throughout the findings.

4.6.1 Responding to RQ1a

Teacher 3 did not state explicitly what their pedagogical stance was. As set out in Section 3.8.1, the analysis and interpretation for RQ1a sought to identify the teacher's espoused pedagogical stance by probing the data beyond face-value. The Funnels of Influence Model (see Section 2.4.3) was used to identify the influences affecting what the teacher espoused, as well as how they espoused it. For Teacher 3 these largely revolved around how the teacher described teachers and learners, the framing of views in comparison to their prior professional experiences, and the recurring foci when they discussed teaching and learning.

Teacher 3 was explicit about their view of teachers and teaching:

> "I believe in teachers being respected and being the… you know… the authority figure… there seems to be a fear of saying they're the authority figure… well no… they are… you are the authority figure" (Extract 61: T3-3, 5.03)

The emphasis on behaviour and the teacher as the authority figure was consistent and frequent throughout the case dataset. TPF descriptors about the view of the teacher and teaching suggested that this created potential alignment with either Constructivism or Behaviourism (but suggested Sociocultural alignment to be unlikely).

For example, where the teacher spoke about the nature of the role of teacher:

> "I believe in some traditional elements of teaching… in my expectations of behaviour… you know, that some people say you earn the right to be respected… I don't. You should start with respect" (Extract 62: T3-3, 0.28)

The teacher explained that they:

> "expect them to be able to do some written work or I talk to them about a rule a grammar rule and that sort of thing" (Extract 63: T3-3, 1.28)

During this part of the interview the teacher was showing the researcher children's exercise books in order to demonstrate the work that had been recently completed by a class. Each child's exercise book had the same learning objective, success criteria and materially the same content. Similar examples of information processing and 'drill and practice' activities were present throughout the dataset and suggested possible alignment with Behaviourism.

However, the teacher referenced different kinds of practice that required further probing:

> "some of the teaching now I do is quite interactive… and you know… it's sort of flashcard based, or they come up…" (Extract 64: T3-3, 1.28)

The teacher's description illustrates a number of difficulties when interpreting data concerned with this case. First, the subjective use of terminology. For example, in Extract 64 above, the word "interactive" was used which the researcher interpreted as children actively interchanging ideas with each other or participating in interchanges with the teacher. However, the example referred to by the teacher in Extract 64 was the use of ICT to replicate the teacher posing a question to the whole class of children and then picking one child to respond (T3, Obs.1,1.7). This espousal by the teacher suggested that their pedagogical stance may better align with TPF descriptors of Behaviourism rather than the researcher's initial interpretation.

The grammar of the teacher's narrative positioned a quiz-style task and flashcard use as a type of interaction within their teaching (T3-3,1.28) which suggested two further possibilities. Either the teacher had a limited awareness of the different ways that children could interact with the teacher and/or each other, or, they were aware but saw those as not applicable within their own teaching. Data where the teacher spoke about influences on their teaching practices were revealing. For example, where they spoke about expectations from their headteacher:

> "There is a bit of a push from the head that some lessons need to be a bit more engaging. That perhaps some are a bit didactic, that some could be a little more lively. Erm… [pause] but he's not telling you how to do that… personally I appreciate that." (Extract 65: T3-1, 2.59)

The latter part of Extract 65 was important because of the way it connected to other data where the teacher spoke about their previous schools and how teaching methods were monitored. Those experiences had partly influenced Teacher 3 leaving previous schools due to what they saw as headteacher interference. The way that the teacher saw their role became revealing about what their pedagogical stance was. For example, the teacher referred to one of the benefits of being in their current school as:

> "I am allowed to carry out my role without too much interference" (Extract 66: T3-1, 4.50)

Furthermore, when asked separately about their professional development needs, Teacher 3 responded that:

> "I don't know… less actually… I probably feel confident in my own way of doing things…" (Extract 67: T3-3, 23.01)

These extracts are representative of two trends across the data for this teacher – that they felt confident in their current practices and did not see a current need for specific professional development. Furthermore, that they saw other teaching colleagues as employees within the same organisation rather than 'knowledgeable others' (i.e. suggesting Constructivist alignment to be unlikely). For example, the teacher spoke about their decision not to prioritise actions from recent whole-school training which they saw as more necessary for peers than for them (T3-6,11.20). The only exception to this trend was where the teacher spoke about attending briefings to update their knowledge on subject specific Common Entrance syllabus coverage. The trend was helpful to be aware of because it suggested focused views about the nature of teaching and learning which when viewed collectively with the way in which they focused on syllabus coverage dissemination and didactic methods suggested the possibility that the teacher's pedagogical stance was one of dissemination of teacher knowledge (rather than dialogic co-construction) which appeared to align more with Behaviourism than Constructivism.

Another revealing aspect of the teacher's espoused pedagogical stance was the way in which they viewed the role of the teacher as an authority (which could be interpreted as either Constructivist or Behaviourist). The teacher perhaps encapsulated their view most strongly when they said that:

> "I'd always wanted to be a teacher. I was drawn to be that person at the front… [laughs]… the position… responsibility… status…" (Extract 68: T3-6, 2.43)

and

> "I think I wanted to be a teacher more than I wanted to teach." (Extract 69: T3-4, 10.40)

As introduced above, the focus on the identity of the teacher rather than the processes of their teaching was present throughout this case dataset. This revealed the nature of the teacher's interest in how their teaching affected children or their learning. For example:

> "they've got to have success criteria stuck in their books, so the idea is we tick, and they tick as well" (Extract 70: T3-5, 24.51)

The ticking of the success criteria itself could be interpreted as part of reflective learning (suggesting Constructivism) or breaking down the curriculum into small steps (suggesting Behaviourism). The teacher's explanation did not attribute pedagogical benefit to comparing children's self-assessment with their own assessment, instead focusing on the procedural process which suggests Behaviourist alignment more likely. This was also

seen elsewhere. For example, in a pre-observation interview (T3-5) the teacher spoke about how they assigned tasks to all children in a given class. The teacher was asked about the nature of needs in the class and identified children where English was a second language and children with SEND (T3-5,13.00). Lesson planning was centred on syllabus coverage (taught content) with the emphasis on exposure and coverage (T3-5,7.40). There was no evidence in this dataset of scaffolding children from their prior learning or taking account of specific individual or group needs (which may have suggested Constructivist alignment). This suggested that the teacher saw the children as either already having the necessary knowledge, or that they did not need prior knowledge for the information processing tasks, which would align more with Behaviourism.

The teacher's espoused pedagogical stance could also be seen where they talked about the purpose of school:

> "ultimately school is about preparing for the next stage of life" (Extract 71: T3-5, 2.15)

At first, this description of the purpose of school could be interpreted in many different ways. For example, the focus on the next stage of life could potentially align with Socioculturalism, Constructivism or Behaviourism. Meaning comes by understanding what the teacher means by "prepare". For example, whether "preparing" is being trained in and then replicating procedures (suggesting Behaviourism), or "preparing" is through an understanding of valued social practices (Constructivism or Socioculturalism). Data from across this teacher's dataset suggested greater alignment with the former:

> "there are times when [a child says] "why do I have to do that?"… I will just say to a child… because I said so… (Extract 72: T3-3, 5.50)

and

> " if you're going to disrupt then you're not welcome..." (Extract 73: T3-3, 3.51)

Viewed collectively, espoused positions such as those above suggest that what the teacher means by "the next stage of life" (Extract 70), is not necessarily about the individual children, but the expected pathway that they would all take (i.e. Common Entrance exam). For example, if "the next stage of life" were viewed through a sociocultural or constructivist lens then the teacher would be unlikely to hold the views set out in Extracts 71 and 72 – which locate the child as a participant rather than agentive. The teacher's focus elsewhere in the dataset on children learning through repetition of information processing such that they pass their Common Entrance exams suggest that "the next stage of life" focuses on a specific tangible result (which would align with Behaviourism) rather than a broader set of skills (which might suggest Constructivism or Sociocultural).

One of the difficulties with analysis of this case was that Teacher 3 framed most of their responses in comparison with previous experiences drawn from both their own childhood schooling as well as previous leadership roles in other schools. Framing theory would suggest that the teacher is controlling the narrative in order to give the researcher a specific picture (the frame) of something to which the researcher has no other access (Nelson, Oxley and Clawson, 1997). In other words, the teacher sought to portray their current experiences as contrasting from their previous experiences – albeit possibly subconsciously. However, whilst the teacher often framed their current school Arena by means of comparison to previous experiences, they did not do the same thing when describing the aspects of their pedagogical stance. For example, the teacher talked about a childhood teacher's method for seating children as being "humiliating" (T3-3, 10.52) explaining that:

> "he did a test and first in the class was there [indicates one end of the class] and the last one was there [indicates the other end of the class] and every week you changed position and I was always… somewhere in the middle… and you always had the same person at the top… I mean my Dad said to me that's competition, you know it's a competitive world, but… it's demotivational for some." (Extract 74: T3-3, 11.04)

In this teacher's own class, they avoided this element of competition by organising seating differently:

> "I sit them in pretty much alphabetical… That's not a school policy that's just what I've always done… Well the first thing that I do when I get a class list is that well are there any that have to be sitting at the front or not next to somebody else?" (Extract 75: T3-5, 10.31)

The latter part of this reflects something the teacher had spoken elsewhere about children with special educational needs sitting at the front close to the teacher desk (conforming to what the teacher said was a school policy requirement) and that this policy was known amongst the children (T3-5,7.06). This procedural focus suggests that the teacher was avoiding the element of competition, complying with the school policy in regard to students identified with SEN, and making it easier to learn children's name by having them seated alphabetically (T3-5,11.24).

The teacher referred to the majority of the children as being of average ability, and also identified children for each class who found lessons particularly easy or difficult (T3-5, 9.42). The framing of this perception suggested Sociocultural alignment was unlikely because the inference was that children have innate ability rather than relational agency (TPF, View of learner and learning, Socioculturalism). Furthermore, the lesson content was based on pre-defined syllabus coverage rather than reflecting prior attainment which suggested Behaviourist rather than Constructivist alignment was more likely.

Cumulatively, the data above suggests that the pedagogical model that the teacher most aligned with based on TPF descriptors was Behaviourism (Table 2.2) due to the focus on:

- teacher as knowledge holder and determiner of classroom activity
- focus on exam preparations
- pre-determined content to be consumed and repeated
- prioritising of behaviour (in disciplinary terms) over learning behaviours
- prior learning and SEND being referenced but not addressed within provision

4.6.2 Responding to RQ1b

As with Cases 1 and 2, the findings from RQ1a were used as a starting point for answering RQ1b (what the teacher's implicit pedagogical stance is). This hypothesised behaviourist stance was probed for intentions that aligned or challenged that view. This was achieved using the processes set out in Section 3.8.2.

Within the dataset for Teacher 3, 71 intentions were identified, and these were grouped into 7 summary categories as seen in Figure 4.12.

Figure 4.12: Summary of Intended practice within Teacher 3 dataset

Category	Summary of Intention	Examples of this Intention within dataset
1	Being seen to conform to expectations	(e.g. T2-1, 5.32, T2-3 1.08), T2-5, 7.06)
2	Tight boundaries set around what is considered part of classroom teaching	(e.g. T2-3, 15.30, 18.38, 21.25, T2-5, 1.22, 2.13, 7.40, 17.17, 23.01, T2-6, 5.08, 6.22)
3	Providing all children with the same tasks and processes	(e.g. T2-1, 2.00, T2-3, 0.28, 3.51, 4.54, 5.03, 5.44, 5.50, 27.17)
4	Direct reaction of childhood experiences of teachers (e.g. "they did… so I won't…")	(e.g. T2-3, 6.05, 6.47, 11.50, T2-4, 10.10, 10.40, 11.16, T2-5, 0.32)
5	Hesitation to engage with ICT due to prior negative social media experiences	(e.g. T2-4, 0.28, 0.46, 5.30)
6	Learning seen as consumption and regurgitation of syllabus information (e.g. quizzes, copying material out)	(e.g. T2-4, 1.53, 2.04, 2.53)
7	Decisions made which prioritise the reducuction on teacher workload	(e.g. T2-1, 0.33, 3.27, 6.44, 9.31, 11.24, T2-5, 1.02, 6.35, 8.43, 10.31, 10.42, 11.54, 12.27, 20.01, 24.06, 24.51, 25.39, T2-6, 0.02, 1.03, 2.50, 3.21, 7.16, 8.02, 11.20, T2-1, 0.00, T2-2, 3.04, T2-3, 19.30, 20.14, T2-4, 11.58)

The process produced a summary of how each category of intention aligned with model of pedagogy descriptors within the TPF. This can be seen in Figure 4.13.

Figure 4.13: Summary of Teacher 3 intentions and their alignment with pedagogical models

Category	Summary of Intention	Mapping to the The Pedagogical Framework
1	Being seen to conform to expectations	"Motivation is extrinsic, learners react to the environment" (**Views of learner and learning, Behaviourism**)
3	Providing all children with the same tasks and processes	"Learning is an individual activity" and "Learning is by imitation or acquisition" (**Views of learner and learning, Behaviourism**)
6	Learning seen as consumption and regurgitation of syllabus information (e.g. quizzes, copying material out)	"Learners are receivers and processors of information and passive in the learning process" and "Learners are viewed as lacking knowledge " (**Views of learner and learning, Behaviourism**), and syllabus consumption as "Knowledge represents how the world really is. The world is given not constructed" (**View of knowledge, Behaviourism**)
2	Tight boundaries set around what is considered part of classroom	The **purpose of schooling / educational goals** as "Forming habits, or rules and procedure and associations between them", and "Teachers are the holders of knowledge - the authority" **(View of teachers and teaching),** and "Learning is by imitation or acquisition" **(Views of learner and learning, Behaviourism)**
4	Direct reaction of childhood experiences of teachers (e.g. "they did… so I won't…")	
5	Hesitation to engage with ICT due to prior negative social media experiences	
7	Decisions made which prioritise the reducuction on teacher workload	

Viewing the intentions for Teacher 3 suggested potential for alignment with TPF descriptors of Behaviourism. However, it was important to search through the dataset for possible contradictions to this hypothesis. Such contradictions were complicated to find for Teacher 3 because of the way that they framed their views. For example, they shared their intention to provide variety in their teaching by setting out that:

> “I like to use a combination of flash cards and PowerPoint because the flash cards are great because children can handle them” (Extract 76: T3-6,7.16)

The inference within the teacher’s intentions were twofold. First, the didactic presentation of PowerPoint slides combined with drill and practice use of flashcards. Second, the perceived benefit to children physically interacting with resources. The latter of these suggested the possibility of the teacher intending to teach in a way which gave children greater agency, thus surfacing the potential for Constructivist or Sociocultural alignment. However, probing this example further the teacher later spoke about the ways in which flashcards were used:

> “Sometimes it's just flash cards on repeat… it gives them an element of a sort of game or competition in it they particularly enjoy that” (Extract 77: T2-6, 8.02)

The focus of the interactivity being about competition as a form of motivation aligned with TPF Behaviourism descriptors.

This teacher framed their responses around the role of the teacher and teacher-initiated methods for distributing knowledge which could suggest either Behaviourist or Constructivist alignment. Looking holistically at the dataset, other aspects suggest Behaviourist alignment to be most likely – for example, the information processing and recall methods identified above (Extract 64). Each of these framed classroom interactions around the role of the teacher as authority. The way in which information was viewed as consumable was also reflected in how the teacher spoke about wanting to attend professional development priorities focusing on Common Entrance exam syllabus matters (T3-1, 11.24), and their prioritisation of school improvement actions focusing on procedural rather than pedagogical matters (T3-5, 24.51). These areas of focus were captured in the summary of teacher intentions (Table 4.19) as those where the teacher was undertaking actions (including espousal) in order to conform to expectations (from exams, parents, headteacher, peers or researcher). Their focus on extrinsic matters as motivating factors again suggests Behaviourist alignment to be more likely than Sociocultural or Constructivist which are closely linked to intrinsic motivation.

4.6.3 Responding to RQ1c

The purpose of RQ1c was to identify how the teacher's observed enacted practices aligned with the models of pedagogy set out by The Pedagogical Framework. The Behaviourist stance found in relation to RQ1a and RQ1b was taken as a starting point – and evidence to refute or confirm this position was sought. This converted the risk of a bias into a tool for checking the robustness of findings.

Teacher 3 was observed teaching three different classes of twenty children. Each lesson took place in the teacher's own classroom with the children arriving at the start of the lesson and leaving for another location at the end. On each occasion the teacher greeted the children at the door, and children filed in and were seated alphabetically by name as assigned to them at the beginning of the academic year (T3-5,10.31). Seating was organised as four rows of six tables all facing the front of the classroom where the Interactive Whiteboard (IWB) was located, with the teacher's desk to its side, facing the children. As with previous cases, Section 3.6.5 set out how observation data was generated, Appendix I contains the observation guide setting out what the focus areas were, Appendix Q contains full observation vignettes for this case, Section 3.7.4 explains how observation data was processed, and Section 3.8.3 set out how observation data was analysed.

Key pedagogical features were identified from across the observation data. These can be seen in Table 4.4.

Table 4.4: Mapping of observed features of teacher's practice with TPF descriptors

Focus area	Features across observations	Mapping to The Pedagogical Framework
Inputs	These consisted of an activity which recalled knowledge from the previous lesson, followed by a presentation or task explanation (Obs. 1, 1.0, 1.7, 1.9, Obs. 2, 1.5, 1.7)	"The teacher limits the information to be processed (stepwise pedagogy)." **(Behaviourism, Views of teachers and teaching)**
Activities	These were either whole class (e.g. group quizzes with children chosen in turn to answer questions), or independent written work where all children were working independently of each other but on the same task (Obs. 2, 1.14).	"Teaching is by drill and practice", "Teachers use pace and competition often to maintain motivation" **(Behaviourism, Views of teachers and teaching)**
		"Learning is by imitation or acquisition", "Learning is an individual activity" **(Behaviourism, Views of learner and learning)**
Language	The teacher language was largely instructional and task oriented (Obs. 3, 1.3, 1.9). They praised children for correct responses and when children gave incorrect responses the teacher used phrasing such as ''what we need to do here is…'' (Obs. 1, 1.11, Obs. 2, 1.13)	"The teacher limits the information to be processed (stepwise pedagogy)." **(Behaviourism, Views of teachers and teaching)**
Relationships	The teacher positioned themselves at the front of the class behind a desk for all of the input and closing parts of each observation (Obs. 1, 1.2, 1.6). During children's independent work the teacher moved along the rows of seating, stopping to check and correct children's work methodically. Children raised their hands to ask for help (Obs. 1, 1.13).	"Teachers are the holders of knowledge – the authority.", "Metaphors for the teacher – lion tamer, sculptor or petrol pump attendant". **(Behaviourism, Views of teachers and teaching)**

(Note: RQ2 below discusses the uses of ICT within observations in detail, so those are not addressed explicitly here).

Using the first focus area – Inputs – data from Observation 1 can be used to illustrate these common features. For example, the teacher explained that the lesson would begin with knowledge recall about names of illnesses from the previous lesson, and then showed images using BoardWorks software on the IWB – asking children to raise their hands if they could name the associated illness. Children with raised hands were chosen, shared their answer, and if correct walked to the front of the classroom to press a button on the IWB in order to progress to the next image (Obs.1,1.9). This reflects TPF descriptors about Behaviourism highlighting information recall and pre-determined information to be processed – as reflected in the right-hand column.

In observation 2, when the teacher gave feedback to children about their written work, they mostly used the pronoun 'we' rather than 'you' (e.g. 'what we need to do here is…'). This appeared to contrast with earlier espoused Behaviourist views, and instead suggested the possibility of Constructivist alignment whereby the teacher was co-constructing with the learner. However, this pronoun use was specific to feedback given by the teacher during children's written work and not consistent with language used during

inputs or other classroom interaction. It has been treated as a learned discourse tool rather than representative of pedagogical values and beliefs.

Key features from TPF Behaviourism descriptors can be seen clearly within the observation data; children as processors of information, responding to teacher instruction, with task completion being for the purposes of assessment. Specific patterns drawn from the data can be used to illustrate this. For example, the majority of activities had right / wrong outcomes which required the children to recall words rather than for example, to apply these words in a range of contexts or extend their vocabulary (which would have suggested possible Constructivist alignment). Additionally, the teacher's focus within lessons was on the sequence of activities; moving through the pre-prepared resources and activities as planned so that all of the pre-determined material was covered (Obs.2,1.14, Obs.3,1.13).

For this teacher their enacted pedagogical stance within the data from observed practices appeared to align with TPF descriptors of Behaviourism, as illustrated above through examples of:

- The teacher as knowledge holder and determiner of classroom activity
- Lesson content as pre-determined knowledge to be consumed and recalled
- Children undertaking individual activities and all children undertaking the same tasks
- Extrinsic motivation (e.g. quiz and recall of information)
- Dialogue and teacher language focusing on task processes
- The focus on exam preparations

4.6.4 Responding to RQ1

In conclusion for RQ1, the evidence suggests that Teacher 3 has an implicit Behaviourist pedagogical stance. There are also two other enduring features which permeate the data:

1) The teacher's pedagogical focus was framed around the teacher's actions and capacity
2) The teacher's very negative previous experiences of social media appear to have a strong influence on their Growth and consequent situational Identity when teaching.

4.6.5 Responding to RQ2

RQ2 asks how the teacher uses ICT in their teaching by considering it in two ways. First, their observed enacted practice and what it reveals about their uses of ICT (RQ2a), and then by probing what they say about using ICT in teaching practice (RQ2b). For Teacher 3 there were three types of uses of ICT within their observed teaching practices. A summary of these can be seen in Figure 4.14.

Figure 4:14: Summary of ICT uses within observations of Teacher 3

Examples of ICT in teaching practice	Purpose of ICT use (category)
Taking the register, displaying the date or task instructions (e.g. Obs. 3, 1.2)	ICT used for administration purposes by the teacher
Interactive Whiteboard used to display presentation materials (e.g. Obs.1, 1.9), or to display a quiz where children are chosen to go to the IWB to press the answer (Obs. 2, 1.7)	ICT to present prepared materials to the whole class - teacher led activities
Children used Chromebooks to access Google Map Street View to remind themselves of a place they were asked to write about (Obs.2, 1.5)	ICT used by children to find information - child initiated activity

Teacher 3 used ICT largely for practical purposes; accessing student data, taking the register or fulfilling utility purposes. In terms of RQ2a this reflects the teacher's uses of ICT as a procedural tool rather than as a pedagogical tool. Other uses of ICT were pedagogical – for example using the IWB to display material so that all the class could see it, such as for the quiz described in Section 4.6.3. This enabled all children to visually compare the answers they had thought of to the correct ones displayed as well as hearing them when the teacher said them out loud.

The second type of ICT use was more complex because it was where ICT was being used by children (rather than the teacher) within their classroom. For example, during one observation children were asked to write descriptively about a specific location. One child initially asked the teacher if they could use a Google Chromebook to look up Google Street View to remind them about the location which would aid them with their description (Obs.2,1.15-1.20). The child had gained familiarity with using ICT in this way (in other lessons with another teacher). The teacher granted permission for the child to do this, and then five additional children requested the same permission. The teacher appeared reluctant but gave permission, and the children then worked independently on the Chromebooks (Obs.2,1.20). The teacher was not observed engaging with the children who were using the Chromebooks. This could have been the teacher encouraging independence within the learning task. However, that interpretation is unlikely because as the teacher moved around the classroom during the activity to check children's work, they engaged with all of the other children who were not using Chromebooks. This apparent distancing themselves from ICT use within the classroom aligns with a finding within RQ2b which is explored below.

RQ2b asks what the teacher says about using ICT in their teaching practice. For Teacher 3 the data for this was extensive but related nearly exclusively to a particular issue – pastoral and behavioural issues arising through social media use in their previous school - as can be seen in Figure 4.15.

Figure 4.15: Extract from Case 3 ICT occurrences in non-observation related data

Int. Ref.	Time stamp	ICT - occurrences in non-observation data	Category
T2-1	11.24	Email use - for contacting colleagues and peers	Workload efficiency
T2-3	12.59	Presence of mobile phones in previous school - seen by the teacher as having a very negative impact on their workload	Workload efficiency
T2-3	13.25	Presence of mobile phones in previous school - the teacher was frustrated by the previous school policy allowing children to have access during the school day	Workload efficiency
T2-3	14.02	Presence of mobile phones in previous school - meaning students could contact their parents before teachers could reach them, changing the [power] dynamics between parents, teachers and children.	Impact of technology use on social dynamics
T2-3	14.51	Use of mobile phones by students at previous school out of school hours - resulting in issues expanding across both school and non-school time.	Workload efficiency
T2-3	15	Use of mobile phones by students at previous school out of school hours - children expected the teachers to intervene in issues hthat had taken place outside of school hours.	Impact of technology use on social dynamics
T2-3	15.3	Presence of mobile phones in school, and issues stemming from 24/7 access to social media - teacher found the blurring of lines about what the teacher is expected to address was difficult.	Impact of technology use on social dynamics
T2-3	16.12	Teacher felt social media makes 'everything so complex'	Impact of technology use on social dynamics
T2-3	16.29	Teacher felt that technology facilitates anti-social behaviour by encouraging greater levels of interaction.	Impact of technology use on social dynamics
T2-3	16.53	Teacher felt that technology brought out behaviours in children that may not have otherwise appeared (e.g. students feeling the need to check their phones and thus refusing to turn them off when requested).	Impact of technology use on social dynamics
T2-3	17.15	Teacher felt that technology makes people braver with what they say because of not being face to face.	Impact of technology use on social dynamics
T2-3	17.43	Teacher felt that technology use meant a greater level of misinterpretation between people when communicating.	Impact of technology use on social dynamics

This teacher had held senior pastoral leadership roles in two other schools prior to joining School B. In those roles they had experienced a number of incidents whereby children had used social media with negative repercussions that had created behavioural and pastoral issues both within and beyond school. The teacher explained their perspective on this as:

> "I can't police what you do at 11 o clock in the evening. They come [mimicking children complaining] look such and such sent me this last night… [returns to normal voice] well it's midnight… you know! [laughs exasperated and shrugs] – what do you want me to do about it [rhetorically]…" (Extract 79: T3-3, 15.00)

The teacher was interpreted at first as being somewhat indifferent to the difficulties that the children were reporting, due to their narrative containing descriptions such as:

> "I remember one of them just standing there and saying… [with stroppy teenager voice] 'What are you going to do about it?' and I remember saying 'right you want

me to go into [town name] and stand on the rooftops with a loudspeaker and announce that do you?' and she stormed out" (Extract 80: T3-3, 18.38)

However, data elsewhere suggested that the teacher's perspective was not indifference:

"I prefer to work with lines… so I used to just say that… if it happens out of school after school hours then we are not going to sanction for things that have happened there..." (Extract 81: T3-3, 15.30)

Accordingly, when the data concerning ICT for this teacher was probed and trends found, they fell into two broad groups:

- Concerns and behaviours relating to historical negative social media experiences
- Functional uses of ICT in everyday life

This can be seen summarised in Figure 4.16.

Figure 4.16: Trends in ICT occurrences within non-observation data

Trend	Summary	Examples
1	Description of technologies in functional terms	(e.g. T2-4, 2.52, 3.58, T2-4, 4.10, 6.02)
2	Resistant to utilising new aspects of technology	(e.g. T2-4, 5.24)
3	Concerns with own children using social media	(e.g. T2-4, 5.30, 6.03)
4	Does not use social media because of negative professional experiences	(e.g. T2-4, 0.28, 0.46)
5	Children's use of mobile phones in [previous] school – teacher perceptions of the impact as;	
	a) adding to teacher workload	(e.g. T2-3, 12.59)
	b) policy to allow children access during the school day	(e.g. T2-3, 13.25)
	c) changing the power dynamics between children, parents and teachers	(e.g. T2-3, 14.02)
	d) enabling issues to continue outside of school hours	(e.g. T2-3, 15.00)
	e) blurring lines about what teachers should get involved with	(e.g. T2-3, 15.30, 16.12, 18.38)
	f) encourages anti-social behaviour by encouraging greater interaction	(e.g. T2-3, 16.29)
	g) brings out behaviours that would not have otherwise been displayed	(e.g. T2-3, 16.53)
	h) makes people braver (T2-3, 17.15), and increases misinterpretation	(e.g. T2-3, 7.43)
	i) consequences of children using social media made teacher's role more stressful	(e.g. T2-3, 18.20)

Through the interview data it had been clear that this teacher had been heavily affected by the pastoral issues that they believed stemmed from social media use by students in their previous school (T3-2,18.20, T3-4,0.28,0.46). The teacher described themselves as resistant to use ICT as a result, and in particular social media and portable technologies (T3-4,5.24,5.30). It is logical therefore that the teacher did not enact or orate many ICT uses in their practices. They used procedural ICT (e.g. register, timetable, projecting

prepared resources) partly because it was expected of them by their headteacher (T2-4,6.52,7.02) and partly because it made their operational activities more efficient (T3-4,5.24). It is useful to recall that Teacher 3 was noted as being focused on the idea of teachers being symbols of authority; stemming from extensive childhood experiences (T3-3,6.05), compounded by professional training (T3-5,1.43) and their own professional practice (T3-1,12.45). This stance could be seen mirrored in their uses of ICT; for example, all observed practices where ICT was used positioned the teacher in the role of authority; either as gatekeeper (IWB quiz, Obs.2,1.7) or presenter (Word being presented on the IWB for children to copy, Obs.3,1.15).

With this in mind, it was interesting that the teacher allowed children independently and unprompted by the teacher, to use the Chromebooks within their lesson. If the teacher had allowed or encouraged that independent use and then engaged in dialogue with the child/ren about the task (rather than the technology) it could be that the teacher was wishing to encourage children's agency (suggesting Sociocultural alignment). To interpret the data that way would have required some evidence of the teacher probing the children's thinking during the task in order to reify or extend their learning. It could have been that the children were permitted to use the Chromebooks in that lesson because of the presence of the researcher (who the teacher knew was interested in ICT practices), and this is possible given that the children seemed excited by the ICT use and explained to the researcher that they did not often use them in this class, but often did so in other classes (Obs.1,1.20). However, it would be a coincidence that the children chose to ask in the very lesson that was being observed given that the researcher had not been introduced to the children by the teacher (i.e. there was no explicit prompt within the lesson for the children rather than the teacher to think about ICT). That aspect of data was inconclusive. However, probing the teacher's behaviour once the Chromebooks had been allowed out, the teacher appeared to want to distance themselves rather than the children from ICT uses. Again, this could be about the teacher recognising their own limitations but still wanting to encourage agency on the part of the children. When considered in light of the teacher's earlier comments about the bounds that they set around the teacher's role in relation to ICT again seems very unlikely.

What appears most likely is that the teacher's actions relating to ICT were framed around the impact that such use has on them personally (rather than on the children, an activity itself, or the other people who are part of the activity).

4.6.6 Summary

Findings from RQ1 set out that Teacher 3 had a Behaviourist pedagogical stance that was centred around the teacher as an authority figure and an expectation on children to conform to that authority. The teacher appeared to bound the role of teacher to what was

deliverable by that teacher. Furthermore, findings from RQ2 set out that their ICT uses reflected that pedagogical stance; with a focus on procedural aspects of teaching, using the IWB to display content, and sometimes allowing, but not actively engaging with, other ICT use in their lessons. However, there were subtleties within the dataset that suggested something deeper. First, the Behaviourist way in which the teacher saw ICT in the first place – as a procedural tool dependent on an authority to control it. Second, the cumulative impact of their negative professional experiences; creating a cyclical effect whereby the teacher saw problems occurring when children were operating outside of teacher-controlled parameters. The more this happened, the more the teacher described distancing themselves from it.

Chapter 4 has presented the findings for each case, organised within each case by research question – addressing RQ1 and RQ2. Findings for RQ1 and RQ2 are cumulative within each case and have led to a summary of findings for each case (see Sections 4.3.6, 4.4.6 and 4.5.6). In each case matters have been surfaced which reflect the relationships between teacher's pedagogical stance and the use of ICT in their teaching practices. Those summary sections have also surfaced notable features which go beyond a surface level relationship between pedagogical stance and ICT, suggesting deeper rooted influences.

RQ3 (what are the influences affecting the relationship between the teacher's pedagogical stance and ICT use in their teaching practice?) draws upon the summary of findings within each case, along with features which invite further consideration. These are addressed across all three cases in Chapter 5.

Chapter 5: A discussion-based response to RQ3

5.1 Introduction

The purpose of this study is to undertake an exploration of the relationship between teacher's pedagogical stance and use of ICT in their teaching practice. In Chapter 4 findings were set out for each of three cases. These findings identified a teacher's implicit pedagogical stance by probing their espoused, intended and enacted practices (RQ1). That process used the Funnels of Influence model to generate relevant data and then signpost what may be influencing the teacher. It also used The Pedagogical Framework to describe their pedagogical stance. Chapter 4 then considered how the teacher used ICT in their teaching (RQ2); probing what teachers espoused and enacted in order to surface notable features and influences. A high-level summary by case, taken from Sections 4.3.6, 4.4.6 and 4.6.4 can be seen in below.

Table 5.1: High level summary of RQ1 and RQ2 for each case

Case	What was the teacher's pedagogical stance? (RQ1)	How did the teacher use ICT in their teaching practices? (RQ2)
1	Constructivist (centred around the teacher)	ICT use centred around the teacher, with a focus on instruction and assessment
2	Constructivist (centred around the learners)	ICT as an enabler, focused on learners and learning short and longer term.
3	Behaviourist (centred around the teacher as authority)	ICT used for tasks where teacher is the authority. Other ICT kept at arms-length.

The final research question, RQ3, asks 'What is the relationship between the teacher's pedagogical stance and ICT use in their teaching practice?' At first, based on the findings in Chapter 4, the relationship appears to be a simple one – that teacher's use of ICT in teaching practice reflects and amplifies an existing pedagogical stance.

For example, Teacher 1 - whose pedagogical stance aligned with Constructivism - used ICT which facilitated children's next steps based on assessment of prior knowledge (e.g. video feedback targeted at groups assessed as being at the same stage, pre-identified instructional videos as part of sequential activities – Section 4.8.3). Similarly, Teacher 3, whose pedagogical stance aligned with Behaviourism used ICT which supported teacher knowledge dissemination (e.g. PowerPoint presentation) and drill and practice (e.g. IWB quiz – Section 4.6.5). Furthermore, the nature of choices about ICT also reflected the teacher's pedagogical stance. For example, Teacher 3 chose ICT uses which supported the administration and dissemination of information - reflecting the way in which the teacher saw their role as the holder of knowledge and authority within learning – features aligning with TPF descriptors of Behaviourism (Table 2.2).

As a surface level response to RQ3, this study found that ICT use reflected the teacher's existing pedagogical stance - as set out in Sections 4.3.5, 4.4.5 and 4.6.5. This finding aligns with existing literature discussed in Section 2.2 (e.g. Maher and Twining, 2017; Luckin, 2018; Selwyn, 2020).

However, as set out in Section 2.4, relationships of any kind are rarely a simple mapping of two things (in this case pedagogical stance and ICT uses), but a broader tapestry of influences coming together. This study went beyond surface-level in order to probe the relationships. Consequently, addressing RQ3 surfaced influences from each teacher's personal funnels of influence (see Sections 4.3, 4.4 and 4.6) and how those influences impacted upon the relationship between the teacher's pedagogical stance and the uses of ICT in their teaching practices.

Data analysis for RQ3 identified that whilst the three cases were unique with very different teachers and practices, there were five permeating themes that ran across them. Consequently, Chapter 5 presents RQ3 findings across all three cases rather than individually. Furthermore, Chapter 5 presents and discusses these five themes in relation to the literature.

5.2 The importance of probing deeper when considering ICT in teaching practices

The choices that teachers within this study made about which ICT to use were revealing about their beliefs and practices. For example, Teacher 3 whose emphasis on the teacher's authority as gatekeeper of knowledge and their teaching being through step-by-step information processing contributed to their alignment with Behaviourism (Section 4.6.4). Teacher 3 reflected those beliefs with the parameters that they set around uses of ICT in their classroom (Section 4.6.5). The finding that teacher's choices about ICT uses aligns with their beliefs was therefore consistent with the findings from Taimalu and Luik, (2019), Tondeur et al., (2017), and Ertmer and Ottenbreit Leftwich,(2010).

Within that literature, Tondeur et al., (2017), specifically noted that not all teachers within the same school held the same pedagogical beliefs and recommended that future research considered this aspect in particular. In this study, it was the specific choices about exactly how the ICT was used, and the intentions embedded within that use which were most illuminating. Through the use of the Funnels of Influence model, data had been generated which revealed specific subtleties and influences within the nature of teachers' pedagogical stance and this enabled a focus on detail within observations which may not otherwise have been identified. For example, the distinctions made through teacher's specific language choices using what discourse analysis terms Framing theory (Nelson, Oxley and Clawson, 1997). Framing theory suggests that how something is presented to

the audience (called ‘the frame’) influences the choices people make about how to process that information. Three examples from across the cases illustrate this.

First, Teacher 1 and Teacher 2 who were both located within the same school, also both aligned with Constructivism. However, there was an important difference between them. Whilst neither stated it explicitly, Teacher 1 framed their Constructivism around the teacher (Section 4.3.4), and Teacher 2 framed their Constructivism around the learner (Section 4.4.4). This manifest itself in how surface-level similar practices were implemented by each teacher and consequently how they were experienced by others. For example, both teachers chose to use QR code linked instructional films within class teaching (Section 4.3.5 and 4.4.5). The teachers both made the films, uploaded them to the school YouTube channel, assigned a QR code to the film and added that QR code to a sheet that Year 6 children then used in class to access the films during their working time. The methodologies used in other studies, if applied to these two uses, would have categorised these ICT uses as the same (e.g. ICF, 2015; EC, 2013). However, as set out in Section 4.3.5 and 4.4.5, the ICT use had a different relationship with each teacher’s pedagogical stance. For Teacher 1, whose films were tightly assigned to specific tasks, the films reduced the children’s dependence upon the teacher (Section 4.3.5). This created additional teacher capacity to provide targeted intervention to children within the lesson. Targeted teacher intervention - focused on specific children’s zones of proximal development - was a key feature of this teacher’s pedagogical stance (Section 4.3.4). Consequently, as set out in Section 4.3.3 dialogue between the teacher and children was centred around addressing content-specific progression (e.g. pre-defined questions, addressing misconceptions, differentiated challenge).

For Teacher 2, children accessing instructional films within a lesson enabled learners to self-pace and self-organise (Section 4.4.5). The teacher’s intentions and enacted practices encouraged dialogue between children and collaborative problem solving. The teacher contributed by extending children and focusing on their broader (not necessarily content-specific) needs – all key features of their pedagogical stance (Section 4.4.3). Consequently, as set out in Section 4.4.3 dialogue between the teacher and children was centred around responsive approaches to individual or group holistic needs – which although bounded by the situation went beyond the lesson content. Thus, whilst the ICT practice itself at surface level appeared the same, the relationship between the ICT use and the teacher was different. It is likely therefore that the children would have experienced the ICT use differently. The teaching practices are therefore not consistent or similar in the way that a surface level interpretation might suggest.

At the heart of this example is a key finding; that underlying motivations and subtle differences in implementation are critical to a meaningful understanding about what is taking place within ICT practices. Whilst previous studies have highlighted the importance

of the implementation of ICT use, these have tended to focus on what is strategically important to the school or operational delivery (e.g. Weatherby and Clark-Wilson, 2019; Passey, 2011). It is not just how ICT is used within teaching and learning that matters, but very precisely and specifically how, and why those choices are being made. This aligns with the findings of Beckman et al (2019) who found that student's experiences of ICT (within teaching practices), were shaped by, and inextricably linked to the contexts in which they occurred. Critically, Maher and Twining (2017) concluded that the nature of ICT use in teaching practices fundamentally changed the characteristics of the student learning experience. As the motivation behind most research concerned with ICT in teaching practices is either directly or indirectly tied to an interest in improving student experiences, this point is absolutely vital.

Similar points have been made by Hammond (2020), when arguing the case for an ecological approach to understanding ICT take-up, and by Beckman et al., (2018), who argued the case for a sociological approach to conceptualising technology practice. This study aligns with those arguments because whilst the main body of literature in Section 2.2.2 does talk about the critical nature of how ICT is being used, there remains a lack of refinement in the definition of what is meant by 'how'. This study shows that probing needs to go beyond what can be observed or self-reported, in order to identify the subtleties of use that reflect specifically why ICT is being used in that way – and thus a more transparent and precise 'how'.

In another illustration, Teacher 2 and Teacher 3 both had a very different approach to ICT use in solving a practical classroom problem. One of the observations of Teacher 3 was a lesson where children were asked to write about a specific location (Section 4.6.5). One child was unable to recall detail about the location and asked if they could use a Chromebook to view Google Street View in order to access the information. The teacher paused before granting permission and then did not engage with that child for the rest of the lesson until after the Chromebook had been put away – distancing themselves from the ICT use and the child. In contrast, as set out in Section 4.4.5, during an observation of Teacher 2, children were asked to access QR code linked resources. There were not enough iPads available so one child asked if they could use a laptop. The teacher and child then entered a dialogue about whether that particular laptop had a QR code reader and the teacher prompted the child (and another child who joined into the conversation) to investigate and find a solution. The children discussed the possible solutions (e.g. searching Google for a downloadable QR code reader), tried them and collaboratively solved the problem. The teacher used language which scaffolded children in discussing the problem themselves and identify for themselves what a solution could be (rather than give them a solution or lead a teacher-to-child dialogue). The practical problem thus

became a life-skill learning opportunity which appeared to be intentional on the part of the teacher - and which was consistent with RQ1a (espoused) and RQ1b (intention) findings.

Therefore, whilst these two examples of ICT use are at surface level very similar – children independently accessing and using a device to access material in a lesson - due to the teacher's pedagogical stance the enacted pedagogy was very different. For Teacher 2 the use of ICT prompted a separation and less communication between the teacher and child. For Teacher 3 the use of ICT prompted wider learning about problem solving. There are all kinds of possible implications and subtle messages within this. For example, drawing upon literature that childhood experiences of teachers contribute heavily to the formation of beliefs about what it means to be a learner (Chang-Kredl and Kingsley, 2014). For one child they became isolated within their learning (Case 3). For the other child they became part of a social dialogue; a small community of practice (Case 2).

Examples such as those above illustrate what Orlikowski and Scott (2008), argue as the bidirectional relationship between a person's beliefs (in this case the teacher's pedagogical stance) and their uses of ICT (in this case in teaching practices). In both cases - at surface level - the child's subject specific learning appeared to be supported by the use of the software in a way that would not have been possible without the ICT. Examples such as these are often cited as good practice in school facing literature (e.g. Jewitt et al., 2010; Higgins, Xiao and Katsipataki, 2012; Puentedura, 2013; Vanderlinde, Aesaert and Van Braak, 2014; Kompa, 2018). However, it is the very specifically how and why ICT is being used that is vitally important to note – to avoid diverting attention back onto 'what' ICT is being used. Whilst in Case 2 the use of ICT prompted additional teacher-child interaction, in the example drawn from Case 3 it is possible that the gains made through the child's use of subject specific software use (use of Google Maps), was then negated by the teacher distancing themselves from the child as a result of them using ICT. This key point is generally not addressed by school facing literature which invites teachers to consider ICT familiarisation phases as cumulatively introducing additional ICT – assuming associated cumulative benefits (e.g. Heppell et al., 2010; Passey, 2011; Clark and Luckin, 2013; NAACE, 2018; EC, 2019; Promethean, 2020).

Generally, the literature does not yet invite teachers to critically consider how children will experience the teacher's use of ICT within their teaching practices. For example, the closest relating material (e.g. Mishra and Koehler, 2006; Luckin et al., 2012; Puentedura, 2013; Coe et al., 2020), simply asks teachers to consider how children could experience the ICT (i.e. the teacher's intentions), and even then the focus is still on what the teacher or child does (in terms of practical actions) rather than the inference – explicitly or otherwise. However, as set out in Section 2.2, there is a shift in direction with studies beginning to consider both the intended pedagogy as well as the influences which shape how that translates into practice and experience (e.g. Twining, Browne, et al., 2017;

Beckman et al., 2018; Beckman, Bennett and Lockyer, 2019; Selwyn et al., 2019). It is this body of literature that this study contributes towards.

A final example of the importance of probing deeper when considering ICT in teaching practices is drawn from a comparison of Teachers 1 and 2. Whilst on different dates and with different groups of children, one of the observations for each of these two teachers happened to take place in the same physical classroom, using the same technology – a portable IWB, wireless mouse and wireless keyboard, and both happened to be with Year 6 intervention groups (Sections 4.3.3. and 4.4.3). During the input that each teacher enacted, both chose to utilise the flexibility of portable ICT in order to be somewhere other than the front of the classroom. Teacher 1 carried the wireless mouse and keyboard as they moved every few minutes to different positions within the room throughout (the children were stationary throughout). Notably, the teacher chose dominant positions (Mandal, 2014) – perching or leaning on children's tables (see vignette in Appendix O). This suggested the potential for either a discomfort with the portability, or an intention to convey authority and monitor children's behaviours as they talked through the input. This contrasted with Teacher 2 who sat amongst the children throughout (see Appendix P). Thus, at surface level both teachers were using wireless technologies to be flexible in their location during their teaching but probing deeper this reflected very different pedagogical strategies. Teacher 2 had used the flexibility to locate themselves amongst the children – enabling better eye contact, discussion and conveying a sense of collaboration (Niederhauser and Stoddart, 2001; Tondeur et al., 2017). Teacher 1 had used the flexibility to move beyond the teacher's desk, but maintained a sense of authority and dominance (Carney, Cuddy and Yap, 2010), that is typically associated with teacher's positioning themselves at the front of a classroom (i.e. if wireless ICT was not available). This reinforces the point that it is not just how ICT is used within teaching and learning that matters, but very specifically how, and why those choices are being made. This aligns with literature elsewhere. For example, when setting out principles of sociomateriality, Orlikowski (2010), argued that influences within what is said and done will manifest themselves through the vocabulary used (in this case by the teacher), how those involved react and interact (in this case with children), and the consequent implications on how [learners] perceive [teacher] actions.

Deep analysis of Teacher 1 and Teacher 2 found that they both aligned with Constructivism and yet their practices were notably different. Teacher 1 centred around the teacher and Teacher 2 centred around the learners. This finding and exemplification of it in practice as set out above reflects the importance of probing deeper than identification of ICT practices and pedagogical model alignment. Furthermore, even though Teacher 1 and Teacher 2 were both part of the senior leadership team in the same school, over the same time period, teaching the same year group, in the same classrooms, and both

working with intervention groups, there were important differences in their practices as well as their pedagogical alignment. Reflecting on this in light of the Funnels of Influence model (Section 2.4.3) this suggests that the enduring features of the school Arena, and stable aspects of the Setting, are not as great an influence on the teacher as the lens through which they view them. Specific to ICT, both Teacher 1 and Teacher 2 had access to the same ICT resources and support (Section 4.2), described the expectations from their headteacher in a very similar way (Sections 4.3.1 and 4.4.1), used largely the same physical hardware and software (Sections 4.3.3 and 4.4.3), and yet did so with very different emphases (Sections 4.3.6 and 4.4.6). This point that enduring features – such as access to ICT - make little difference to the nature of teaching, aligns with findings from other studies. For example, a large scale quantitative study across 13 countries by Light and Pierson (2012) found that where teachers have access to an ICT infrastructure above a minimal level, that access made insignificant difference to the nature and frequency of ICT use within teaching. This qualitative study complements those quantitative findings and suggests that influences from the teacher (as identified through the Funnels of influence from The Self – Section 2.4.3) have far greater effect on the nature of ICT use than influences from the school Arena (e.g. Funnels of Influence from The Context – Section 2.4.3).

There is another aspect to the consideration of influences from The Context (Funnels of Influence – Section 2.4.3) and that is the role of the headteacher's expectations on the teacher. In this study, headteachers for both schools espoused similar intentions about how they wished for ICT to be used as one of a number of tools available to children, and both spoke about children having immediate access to devices to enable this (Sections 4.2 and 4.5). Given the similarity of headteachers' espoused views and infrastructure in both schools (HT1, 24.23 and HT2, 23.34), one might expect there to have been similar practices across the cases. However, it was striking that each teacher had a very different relationship with ICT (see Sections 4.3.6, 4.4.6 and 4.6.4). This suggested that the influence from the headteacher, and school Arena (e.g. the infrastructure in place), was of less influence than the influence from within the individual teachers themselves (The Funnel of Influence from The Self – Section 2.4.3). Lave (1988), in setting out her theory of situated learning, saw the Arena as mediating what then becomes possible for those interacting within it. In school centred studies, the headteacher – alongside others - has often been central to data generation identifying features of the Arena (Twining, Browne, et al., 2017). Yet, building on the possibility outlined above that the influences from the Arena may not be as great as the lens through which the teacher views that Arena, raises another possibility. That the headteachers in terms of their presence in the Arena may not be as much of an influence as the role that they play in direct experiences with the teacher (i.e. enacted practices involving both teacher and headteacher which then contribute to

the teacher's Growth – see Section 2.4.3). This is in alignment with a key finding from Twining, Browne, et al., (2017), that whilst the school Arena is important, individual teacher's identities and pedagogical stance may be more important determinants of their practice related to ICT use.

5.3 The importance of framing within a pedagogical stance

Building on discussion which exposed the importance of probing deeper into teacher's practices, it is helpful to consider the subtleties within teacher's pedagogical stance and how these affected data within their case. As introduced in Chapter 4, Framing theory (Nelson, Oxley and Clawson, 1997) would suggest that the ways in which teachers spoke about their practices and beliefs was as revealing about their implicit pedagogical stance as the content of the espousal itself. Findings from this study suggest that relationships are not necessarily what originally appears through espousal or observation. Teacher 1's espoused beliefs pivoted around encouraging children's independence (Section 4.3.1). Enacted practices using ICT pivoted around the needs of the teacher (Section 4.3.5). As set out in Section 4.3.3, additional analysis revealed that the undercurrent to the teacher's practices was for children to be independent from the teacher in specific tasks (e.g. children re-watching films or re-winding audio materials rather than asking the teacher to repeat demonstrations or orations). As identified in Section 4.3.4, this created teacher capacity which the teacher then repurposed elsewhere in their teaching practice. The children still benefitted but the pivot point was the teacher (and their repurposing of capacity) rather than the child (and the development of their self-regulating learning skills). There are three important parts to this. First is that the finding was dependent on researcher reflexivity; challenging data and being open to possibilities that contradict previous findings and interpretations (Berger, 2015). Within that reflexivity it is important for the researcher to consider the role of Framing theory (Nelson, Oxley and Clawson, 1997) and how it affects what emerges from the teacher, as well as the way in which the researcher receives and interprets it. Second, that only by probing the data deeper than surface-level practices was the nuance about the nature of independence surfaced (building on Section 5.2 above). As argued by Selwyn (2020) existing literature tends to depend upon quantitative studies, self-reporting and surface level observations (see Section 2.2.2). Such studies are unlikely to identify the nuances and therefore the important impact that framing has on what teachers say and do, and therefore what children experience. Finally, and most importantly, the framing by Teacher 1 of the video use as encouraging children's independence [from the teacher in that task] combined with the teacher repurposing their capacity surfaced what the teacher did with that additional capacity. The choices about how that additional capacity was utilised revealed detail about the teacher's pedagogical stance. This aligns with findings in other studies about the choices that teachers make about ICT practices being revealing about their beliefs

(e.g. Taimalu and Luik, 2019; Karaseva et al., 2015; Ertmer and Ottenbreit Leftwich, 2010). For example, as set out in Section 4.3.3, Teacher 1 chose to use the additional capacity to provide 1:1 intervention; questioning, extending and correcting misconceptions – aligning further with TPF descriptors of Constructivism (Table 2.2). This further evidenced the finding about the teacher's form of Constructivism pivoting around themselves.

The role of framing is largely absent from literature concerned ICT in teaching practices. For example, most models assume there to be consistency in how a single intention for teaching and learning is framed (e.g. NAACE, 2018; Puentedura, 2013; Whyley et al., 2010; Mishra and Koehler, 2006). It is possible that the creation of such frameworks (Section 2.2.4) recognised the potential for multiple perspectives and frames within individual actions and opted to exclude them from the models for the purposes of widespread ease of use. However, there is nothing within the related literature itself to suggest that this is the case. It is more likely that such models - which in the field are not unusual in their approach to this matter – have instead been built upon a now disputable assumption. That incorrect assumption is that teachers using 'the same' ICT in their practice will be aligned in their pedagogy. This study supports a growing body of literature to suggest that there is sufficient evidence to argue that this is not necessarily the case (e.g. Selwyn, 2018; Beckman, Bennett and Lockyer, 2019).

In this study, the Funnels of Influence model (Section 2.4.3) was used to generate data which surfaced influences which had specifically impacted upon the teacher's current espoused, intended and enacted practices. Those influences accumulated from previous experiences to contribute to what Esteban-Guitart and Moll (2014) and Moll et al., (1992) referred to as the teacher's Funds of knowledge and Identity. These Funds shaped the lens through which the teacher viewed each Moment of practice and how they then framed what followed. Across all three cases, the influence of the teacher's own childhood teachers was present and appeared to be an important factor in how the teacher framed their own pedagogical stance, aligning with other studies which found this to be a consistent influence across teacher studies (e.g. Chang-Kredl and Kingsley, 2014).

As Chapter 5 is a discussion-based response to RQ3, the unusual step of including data extracts is used here to illustrate a key point. Section 5.3 is setting out the importance of considering framing within the relationship between teacher's pedagogical stance and ICT in their teaching practices. What now follows are illustrations from this study about how teacher's childhood teachers affected the frame through which the participants of this study viewed teaching and learning.

For example, Teacher 1 had spoken extensively about the expectations placed upon them by their school:

> “we were ability set… [pause] what was drummed into me all the time – you have to be at the top because if you’re not you’ve had it… it was always a struggle… and I never quite felt good enough.” (Extract 82: T1-1b, 20.50

Whilst the data available is insufficient to draw conclusions from, the origins of the teacher’s continual strive for improving their practice as a child creates a striking parallel to their focus on improving their teaching practice through the data within this study (i.e. framing their Constructivist stance around themselves – formatively as the learner and in the current day as the teacher).

Discourse distance markers (Schiffrin, 1987), suggest that the framing created by the use of “you” in Extract 82 reflects the teacher’s sense of the struggle being one they faced on their own – with minimal support from their childhood teachers. Thus, the teacher-centric (or perhaps more accurately described as self-centric when in the role of teacher) nature of Constructivism for Teacher 1 appeared to be in place from their formative years - well before they became a teacher. This raises questions about when and where someone’s pedagogical stance begins to be formed.

Similar childhood parallels can be found within the data generated with Teacher 2, who spoke about the huge influence that a teacher had on them as a child. As set out in Section 4.4.1, this teacher had experienced a childhood teacher who had spent substantial amounts of time and energy coaching them through specific difficulties in their learning. Again, whilst there was insufficient evidence to draw solid conclusions, it appeared possible that for Teacher 2, their relationship with a childhood teacher set out their view of what a teacher is – someone who “puts in that extra bit of effort for me” (T2-1, 11.59) – notably, beyond lessons. It’s possible then to see parallels with how Teacher 2 framed their own role as teacher; as a facilitator for children beyond the bounds of lessons or learning objectives (as set out in Section 4.4.4).

The same parallel can also be seen for Teacher 3, who saw childhood teachers as authority of all around them, and notably, in a school where as a child they felt disempowered (T3-3, 6.05). The permeating presence of references to authority and behaviour throughout the Teacher 3 dataset (see Section 4.6.4), reflected that childhood lens on their professional practice.

These examples are set out to illustrate how childhood teachers appear to be an important influence in the formation of teacher’s pedagogical stance. This aligns closely with a study by Chang-Kredl and Kingsley (2014), who found that teachers either replicated or reacted to specific childhood experiences of teachers, but were rarely unaffected by them. This raises the possibility that teacher’s pedagogical stance, and the framing within their pedagogical stance, both begin to be formed in childhood – certainly well before a decision is made to become a teacher, or teacher training undertaken.

Section 5.2 set out why probing deeper into data concerned with ICT in teaching practice surfaces important findings about pedagogical stance and how it can make profound differences to ICT practice. As Section 5.3 has set out, the framing within this pedagogical stance becomes absolutely vital in meaningfully understanding ICT practices. It appears that to align a teacher with a model of pedagogy (e.g. through the use of The Pedagogical Framework, Table 2.2) can go some way, but not all the way, towards forming a description of a pedagogical stance. But, that to understand the framing within that pedagogical stance a deeper sociological understanding is necessary, and that the Funnels of Influence model (Section 2.4.3) is a useful tool for generating the data required to do so. This becomes important when considered in light of studies such as one by John (2005), who found that teachers tend to choose ICT designed to serve the teacher's needs. Therefore, those individual needs (as surfaced through pedagogical stance and as framed by their personal funnels of influence), need to be understood more comprehensively than at surface level in order to enable any kind of understanding or support of meeting them.

Building on the findings from John (2005), this study found that what an individual teacher perceives as a need depends on both their pedagogical stance and the influences that have affected how that stance is framed. This is now illustrated by returning to how each teacher responded to the children within the lessons observed in this study.

As set out in Section 4.4.3, for Teacher 2, one of the most noticeable ways that ICT was used was to meet the specific needs of individual children (e.g. Clicker for children who struggled with reading and writing). The notable feature was that Teacher 2 took into account the child's emotional relationship with what was being asked of them. When one child wanted to use a laptop to write their story rather than write in their exercise book, the teacher took the time to unpick the child's reasoning which surfaced that it was about the child wanting to be able to draft and edit without committing to paper. The child was concerned with the editing process itself rather than the tool used to do so. The teacher utilised that knowledge to enable the child to work more effectively on the lesson objectives (i.e. the teacher focused on the drafting and editing process with them). This example surfaced a difference between Teacher 1 and Teacher 2 (despite their working in the same school, with access to the same ICT, and both aligning with Constructivism). As set out in Section 4.3.3, Teacher 1 provided consistent provision to the class (i.e. instruction videos, staged worksheets, tasks) and then individualised teaching through their targeted intervention and scaffolded children's self-pacing (e.g. re-watching videos, progressing to the next worksheet, re-winding audio recording). Teacher 2 however, kept the overarching objective consistent for all children (e.g. use of vocabulary in story writing) but differentiated access to that task and components within it (e.g. in the writing task

having one group use Clicker and another handwriting, alongside their targeted intervention).

Whilst Teacher 1 pivoted decisions around themselves as the teacher, their self-improvements were still intended to provide better learning experiences for the children. Similarly, whilst Teacher 3 was distancing themselves from the children using ICT independently, the children were still able to do so. All three teachers would be considered high performing in terms of their class' assessment data. A critic might ask why these differences therefore matter. This is best illustrated through the dialogue between teachers and children; the nature of their language and the bounds of the children's learning that the teacher engages with. Teacher 1 and 3 were both focused explicitly on the short-term, lesson or sequence of lesson objectives, and Teacher 2 was focused on long-term life skill development as well as the lesson objectives. This is an important point to be aware of when considering how best to support teachers in their uses of ICT.

5.4 The underlying role of values as a lens on ICT

As set out in Section 2.4, a teacher's underlying values act as deep foundations upon which they build their lives (Halstead and Taylor, 2000). These values came into existence in their very formative years and well before they had any sense of pedagogy (Nias, 1993; Rogers and Scott, 2008; Beltman et al., 2015). What emerged from the cases within this study is that the teachers' values became a lens through which experiences – including those with ICT - were viewed. That lens then determined how a teacher engaged with ideas and practices, and that in turn then looped back into the teacher's store of what the Funnels of Influence terms Growth experiences; refining that lens for future experiences. This aligns with findings by Nykvist and Mukherjee (2016), who found that perceptions of ICT cause teachers to think in relative terms about themselves and others. The most notable example was the way in which Teacher 3 explicitly minimised their engagement with ICT as a result of their previous negative social media experiences (as detailed in Section 4.6.5.). The impact of this was that in observed lessons, children using ICT consequently received less attention from the teacher than their peers. However, at the same time, the use of ICT (i.e. independent accessing of a device and then using Google Street View to source information) made it possible for the children to do something that they could not otherwise have done (i.e. on-demand visuals of a specific place of their choosing). Through a lens focused on ICT, the use could be conceived as beneficial using frameworks such as those identified in Section 2.2.4 (Puentedura, 2013; Kompa, 2018). However, through a lens focused on pedagogy, the use could arguably be seen as detrimental in this specific case, because the teacher avoided engaging with the child because of the ICT being used. Furthermore, building on the way in which Esteban-Guitart and Moll (2014), set out that Funds of knowledge and Identity are formed, there is a possibility that where the teacher experiences this kind of ICT use (i.e. child uses ICT

and completes their work without teacher intervention), their intention to keep ICT at arms-length becomes reinforced or justified.

All three teachers were aware of expectations to use ICT based on children using it in their wider lives (see Sections 4.3.5, 4.4.5, 4.6.5). Each teacher responded to those expectations differently. Framing theory (Nelson, Oxley and Clawson, 1997) would suggest that teachers' personal relationship with ICT was surfaced by the way in which they espoused the role of ICT in society. For example, Teacher 1 explained that:

> "technology is such a massive part of their lives… because that's how they see the world, coming into a classroom where someone is giving you instruction, that's not really going to do it is it?" (Extract 83: T1-2a, 20.23)

Notably, making a direct link between children's uses of ICT, and the teacher's instruction (which at the point of the interview was not the focus).

As set out in Section 4.4.5, Teacher 2 referred to ICT as enabling opportunities for all children, connecting it back to their childhood teacher giving them greater opportunities. As set out in Section 4.6.5, for Teacher 3, their relationship with ICT centred around fears – stemming from their own negative professional experiences with social media and young people. For each teacher, the links between their knowledge of how ICT was used (positively and/or negatively) by others affected the way in which they now related to ICT – aligning with how Esteban-Guitart and Moll (2014) set out that Funds of Identity become formed.

The vital part of this is that the interpretation by the teacher of those previous experiences about how others related to ICT, was through their own values lens which framed how they saw and interpreted those experiences. For example, data for each teacher reflected where ICT had influenced their actions and thinking; Teacher 1 centering this by comparing themselves (including ICT use) with others (Section 4.3.5), Teacher 2 talking about gathering ideas from others (including Twitter) to improve opportunities for children (Section 4.4.5), and Teacher 3 reflecting on negative (including social media) experiences (Section 4.6.5). What was notable for each teacher was that their underlying values – incorporated within the Roots and Growth of their personal Funnels of Influence - determined the lens through which they viewed each occurrence of ICT thereafter. This can be exemplified through Teacher 1 utilising ICT giving them greater capacity for improving their own understanding and teaching skills (Section 4.3.3); Teacher 2 using ICT to open up previously assumed inaccessible opportunities for children (Section 4.4.3); and finally, Teacher 3 using ICT to maintain authoritative control whilst distancing themselves from social media (Section 4.5.3). This suggests that the relationship did not begin with teacher's pedagogical stance and ICT, but that teachers' underlying values act as a lens through which ICT was then viewed. The presence of ICT – directly, culturally

and environmentally - created more situations where they were experiencing it (not just through teaching or school), which dependent on those experiences served to compound their views. This aligns with how Bourdieu (1977) set out theories of Habitus and Capital as introduced in Section 2.4. There becomes a cyclical process through which experience of ICT – whether positive or negative – has the potential to reinforce existing views by simple nature of the existing lens that the teacher has. This finding is in friction with recommendations in other studies (e.g. EC, 2013; Vanderlinde, Aesaert and Van Braak, 2014), which argue that exposing teachers to ICT practices will play a role in causing them to engage in ICT use. It is possible that for some teachers (such as Teacher 2 in this study), the opposite may happen.

5.5 The importance of language

Each teacher in this study espoused their overarching pedagogical stance (RQ1) by articulating their ideas about what good teaching and learning looked like. Personal vocabulary choices are value laden and sometimes infer messages that the speaker is not necessarily consciously aware that they are conveying (Tannen et al., 2015). This study has used aspects of discourse analysis to go beyond surface level interpretations. Within a discussion-based response to RQ3 it is therefore helpful to consider the relationship between the discourse features and ICT practices.

Detail within Chapter 4 described the important roles that Framing theory (Nelson, Oxley and Clawson, 1997) and Centering theory (Walker, Joshi and Prince, 1998), played in surfacing teachers implicit views. For example, teachers in this study framed their responses around either the teacher or the children (Sections 4.3.1, 4.4.1, and 4.6.1). Furthermore, the three teachers all compared their uses with colleagues as part of their responses. For example, with Teacher 1 using what discourse analysis calls Oppositional Positioning (Tannen et al., 2015) – described in Section 4.3.1. This surfaced inferences about how Teacher 1 framed their use in comparison to what they thought possible or appropriate – in other words, reflecting their ideological view on the role of ICT as well as surfacing their own enacted practice. For example, Teacher 1 felt that their use of ICT was basic compared to other teachers despite enacted practice featuring the broadest range of ICT of any of the observations (Section 4.3.5). Teacher 2 felt that ICT enabled them to access more-expert others as a source of knowledge about ICT practices which could be later adopted, despite being able to articulate and enact a range of unusual and innovative ideas themselves (Section 4.4.5). Teacher 3 espoused very negative views about what should be used or not used within school and referenced differences between colleagues to illustrate that (Section 4.6.5). Discourse around ICT was arguably more relational than other subject matter. For example, none of the teachers spoke about how peers responded to other subject matters when they were framing discourse about writing, marking, curriculum subjects, and so forth. It is possible that this is because of the focus

of this study and that the teachers wanted to generate relevant data. However, other ways in which the teachers spoke about ICT suggest that to be unlikely.

For example, when talking about their espoused views on teaching and learning, and about ICT, none of the teachers spoke about ICT specific expectations placed upon them by their headteachers. There are a few possible reasons for this. Perhaps the vision about the use of ICT was so embedded within school life that it became an assumption and therefore not explicitly addressed. This is possible, and each teacher mentioned other leadership expectations (e.g. Teacher 3 talking about marking policies (Section 4.6.1) and Teacher 1 talking about team-planning (Section 4.3.1) but none mentioned leadership expectations about ICT despite them being aware that it was the focus of this study. Or, perhaps the teachers, knowing that the researcher had interviewed the headteacher, assumed the researcher's familiarity with the school vision and expectations and consciously omitted discussion of it as a result. Again, this is possible, yet none of the teachers referred to any shared understanding of such expectations which suggests that this was not the case. Another interpretation could be that rather than seeing ICT as a tool, policy or classroom strategy (i.e. how one might describe the other things discussed), they saw it instead as a bigger, social, cultural phenomenon of which school only played a part. Thus, instead of referring to ICT as an object or resource (i.e. maths, feedback, exercise books), each teacher referred to its use as a culturally or socially formed construct (e.g. independence, control, enabler, threat). Data generated suggests that the latter interpretation is the most likely. This finding is in alignment with Hammond's (2014) note of caution against studies which frame ICT as having objective qualities rather than recognising them as being socially constructed.

With the embedded nature of ICT being consistently referred to as a construct rather than object, conversation about ICT becomes value laden; much as they do in similar fields such as writing, where culturally formed concepts are the focal point (e.g. Chamberlain, 2015). This value-laden nature of discussion about ICT aligns with three arguments set out in Section 2.2. The first being that as Beckman et al. (2019) argued, ICT use does not take place separately from the values of the person using it. Second, that in recognising the complexity of the relationships between teachers and ICT, the findings of this study also align with the argument made by Selwyn (2018), for rebalancing the literature. As set out in Section 2.2.3, Selwyn argues against the over reliance on quantitative data and its limitations; constraining perspectives and distracting or preventing researchers from focusing on what does happen (as opposed to what could happen). The Funnels of Influence in this study (see Section 2.4.3), locate that difference as focusing on Possibilities rather than Enacted practices (see Figure 2.6). The important distinction is the role that the Funnels of Influence from The Self plays in filtering the potential of Possibilities into lived-out Enacted Practices.

5.6 The relational nature of ICT discourse

As set out above, the way in which the teachers viewed ICT - and their relationship with it – was through a pre-existing lens. In terms of the aim of this study, there is then a specific aspect of this which becomes problematic.

Frank et al. (2014) talk about how immersion in multi-sensory experiences through every day ICT uses creates a kind of halo around us - affecting the way that we then perceive and interact with the world. Furthermore, that this frames our perception and interpretation of both ICT itself, and features which relate to ICT indirectly. An example of this in practice might be how a person views the necessity of handwriting when they see others record through typing, speech or video. In contrast, that same person might not notice the lack of staff operated tills in a shop because they are so used to the self-service checkouts. In other words, exposure and immersion in ICT through everyday lives thus affects perceptions of ICT even when a person is not directly using or interacting with it.

When a teacher views an aspect of ICT (e.g. a device), they are doing so through a lens formed by what the Funnels of Influence model calls Influences from The Self (Figure 2.6). That lens will shape how that ICT is conceptualised; whether it is seen as an asset or a threat, and what actions it offers, and to whom. That same lens will also shape how that teacher (person) sees their role in relation to that device. As Frank, Roehrig and Pring (2014) argue therefore, before the device is even switched on or introduced, there is a relationship between the person and the device. The findings above would suggest that the relationship is irrespective of the school environment or expectations that the teacher is existing within. Only once the device is surfaced (e.g. switched on or mentioned) within the context of a specific Arena, do the possibilities offered by the device become shaped by Arena specific expectations and how they compare to what the Arena is able to accommodate (e.g. connectivity) and the specific expectations for its use by those leading that Arena (e.g. homework tasks posted on a school portal, IWB used during teacher inputs, email for internal communications).

In the literature review material was drawn upon which laid out how our espoused and implicit values and beliefs come to exist (e.g. Wenger, 2010; Bourdieu and Wacquant, 1992), and the findings above suggests that ICT cannot be conceptualised separately from the values through which they are viewed. This point is important, and it goes further than the trend across existing literature that ICT should be considered in conjunction with effective pedagogy (e.g. Stringer et al., 2019; Higgins et al., 2012). This builds upon the discussion in Section 5.5 and suggests that the role of a teacher's lens in framing how they are first introduced to an ICT construct suggests that a values-based relationship with that ICT will exist even without the ICT being used in the teacher's practices. This closely

aligns with Beckman's (2019) argument that ICT practices do not exist without the individuals who use them.

In parallel to this Selwyn (2016) argued that ICT tends to be considered as relative good rather than absolute good because of the value-laden differences in how we each interpret ‘good’. This study goes one step further and argues that the concept of ICT itself is so value laden that it cannot (and should not) be considered as a separate entity from the values it emerges from, and that it will always be relational. Data in this study surfaced how different experiences can be even when ICT practices appear to be the same at surface level and in contexts which appear the same at surface level. It is the specific framing of those experiences which determines how they are received and experienced by both the teacher and others they are working with. In other words, the impact of ICT in teaching practice is best seen by looking beyond pedagogy and action; digging into the framing of the experience and the implications that has on those involved. This affects how we think and talk about ICT in teaching practices.

We need to find a new way of discussing ICT within teaching and learning that surfaces, and takes into account pedagogical models, but more specifically, different ways of framing ideas within those models. Literature generally refers to ICT in education as: tools (e.g. EC, 2019; ICF, 2015), habits or practices (e.g. Falloon, 2015; Gudmundsdóttir et al., 2014; Gurung and Rutledge, 2014; Johnson, 2010; Rowlands et al., 2008), or enablers and socialisers (e.g. Taimalu and Luik, 2019; Luckin et al., 2016; Rashid and Asghar, 2016; Rehm and Notten, 2016; Frank et al., 2014; Segev, 2010b). Furthermore, the same body of literature generally positions a particular pedagogical stance as desired. The difficulties then come when approaches highlighted by that literature suggest ICT practices are transferrable as means to enact or spread a desired pedagogical stance. As data and findings from this study show, the surface level actions in practice can appear to be transferrable across teachers - but the impact on learning can be greatly affected by the framing within the pedagogical stance of individual teachers. Perhaps therefore, the ‘what works’ model of innovation that is prevalent in education technology is fundamentally flawed.

As Selwyn (2011) argues, much of the justification for ICT use is as a form of pedagogic corrective – a means to get certain forms of learning into formal educational settings that are otherwise seen to be lacking. The friction between intentions to cascade particular types of pedagogy and practice, and the different framing of those pedagogies by the receiving teachers, may explain something about why endeavours to cascade successful ICT practice across what appear to be similar contexts has not been more fruitful (see Section 2.2.1). The literature review of this study set out that there is not complete agreement about what great teaching and learning looks like (see Section 2.2.2) and the findings of this study suggest that even if that agreement was reached, the practices and

subtleties when enacted by individual teachers would likely still perpetuate very different experiences for the children being taught. Furthermore, it is not sufficient to be content with replicating successful practices across teachers – so called 'sharing best practice' or 'cascading successful strategies' because these may be enacted very differently even by teachers sharing what appears to be pedagogical alignment.

5.7 Summary

This discussion chapter has sought to draw together key findings from each case and across the cases in order to illustrate overarching findings specific to this study. These include that:

1) This study aligns with existing literature in finding that teacher's use of ICT in teaching practice reflects and amplifies an existing pedagogical stance
2) That sometimes this is explicit, and sometimes this is not immediately obvious
3) Probing the use of ICT in teaching practices beyond surface level can reveal very different pedagogical intentions
4) Teachers working within the same school, supporting the same vision and ethos, and using the same classroom resources can have different pedagogical stances
5) Even when teachers appear to align with the same pedagogical stance (as set out in The Pedagogical Framework – Table 2.2), their framing of that pedagogical stance may be different (i.e. framed around the teacher or framed around the leaner)
6) Teachers using what appears to be the same ICT in their teaching practices can be enacting very different pedagogical approaches
7) Due to teachers enacting different pedagogical approaches, or framing their pedagogical stance differently, learners will experience learning differently even when engaging with 'the same' ICT processes or resources
8) ICT use in teaching practices can act as a catalyst for teacher's supporting children's wider learning needs, but that this stems from the teacher's pedagogical stance, not the ICT
9) ICT use in teaching practices can trigger teachers to behave in different ways, but that this stems from the teacher's prior experiences, not the ICT,
10) An understanding of the individual teacher's unique set of influences acting upon them at the moment of practice is vital in order to unpack that practice meaningfully
11) There is a lack of refinement in existing definitions of 'how' ICT is being used which is inadvertently deviating attention back onto 'what'
12) Influences from the teacher (as identified through the Funnels of Influence from The Self) have far greater impact on the nature of ICT use than influences from the school Arena, yet 'the school' (rather than 'the teacher') remains the focus of much of the literature relating to ICT in teaching practices

13) The notion of ICT supporting learner independence is a subjective concept – with independence sometimes being conceived as 'from the teacher during class time' as well as 'in order to self-regulate learning as a life skill',
14) Teachers relationship with ICT in teaching practices exists even when ICT is not being used within practice
15) Teacher's own childhood teachers play an important role in how they conceive the idea of what it means to be a teacher or a learner
16) Teachers choose to use or not use ICT that aligns with what they perceive their needs to be. These perceptions are shaped by many influences as set out through the Funnels of Influence model
17) Teachers experiences of using ICT in teaching practices contribute to their Funds of Knowledge and Funds of Identity and thus affect future espoused, intended and enacted practices
18) There may be a cyclical process whereby teachers' experiences of ICT – whether positive or negative – have the potential to reinforce existing views by the simple nature of the existing lens that they had when experiencing it
19) Teachers espousing explicit awareness of the importance of ICT in children's lives does not necessarily mean that they will then incorporate ICT into their teaching practices
20) Language and dialogic undertones play an important role in how teachers frame discourse concerned with ICT in teaching practices
21) ICT in teaching practices should not be thought of as having objective qualities – what the Funnels of Influence refers to as Possibilities
22) The prevalent 'what works' model of innovation within educational technology focuses on Possibilities (point 21 above) which is not the same as practice
23) ICT in teaching practices when viewed instead as socially constructed recognises the role of values and influences which directly impact enacted practice.

Chapter 5 was introduced as a discussion-based response to RQ3 (What is the relationship between a teacher's pedagogical stance and the use of ICT in their teaching practices?). The chapter set out findings from across the cases, organised by themes (Sections 5.2-5.6). The summary above (Section 5.7) draws out the key points from across those themes. A number of the key points above refer to the Funnels of Influence model; the role it plays in locating an influence and the relationship between different influences. In light of the findings above, some minor amendments were made to the original Funnels of Influence model (Figure 2.6), and these are presented in Chapter 6 as part of setting out one of the contributions that this study makes to the field. Chapter 6 will also set out the limitations of this study and implications for future research, policy and practice.

Chapter 6: Conclusions

Chapter 6 draws together the final outcomes of this study by first outlining the contribution offered to the field of ICT in teaching practices. The chapter then sets out the limitations of this study, before surfacing implications for professional practice and policy, and finally, what could be addressed in future research.

6.1 Contribution to the field

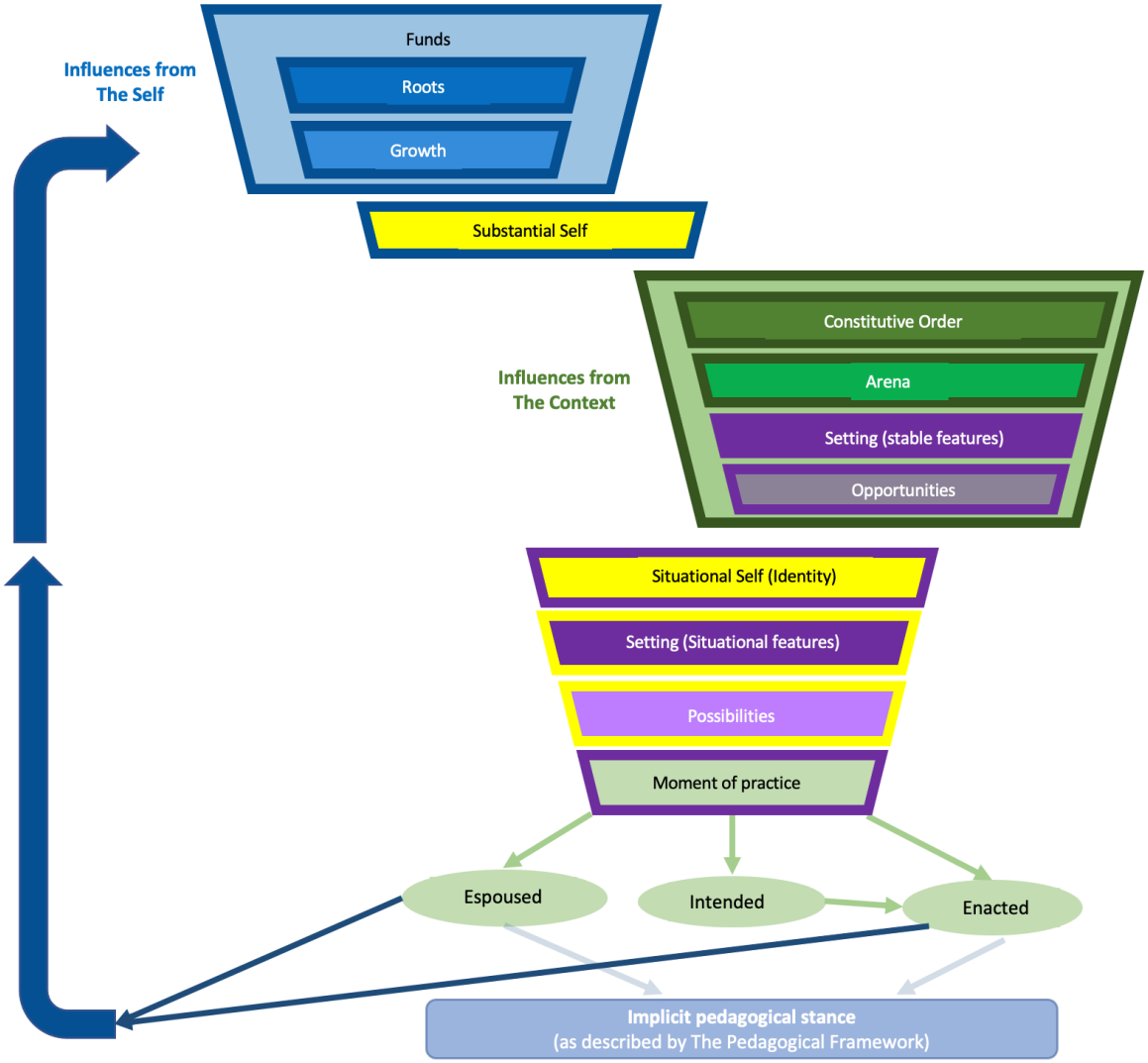
As set out in Chapter 5, this study has surfaced the importance of probing deeper than surface level when considering the use of ICT in teachers' practices. Chapter 4 provided illustrations of how individual teachers espoused or enacted a particular pedagogical stance only for data elsewhere to surface friction within their own words and actions. Chapter 5 discussed examples where teachers appeared to be enacting the same ICT in their teaching practices, and yet through deep probing, important differences were found which would almost certainly affect the way in which children experienced that practice. Therefore, whilst the literature review extensively set out that ICT must be used in a way that is informed by effective pedagogy (Section 2.2.3), this study proposes that to just look at the pedagogical stance is not enough. To see the connections between ICT in teaching practices and the impact that it makes on children's learning, it is the individual teacher's framing of their pedagogical stance that should be the focal point, and the influences that are at play in shaping that.

Literature also set out the role of teacher beliefs in their decisions about using ICT in teaching practices (Section 2.3). This study proposes that a teacher's underlying values – the Roots that are established during their childhood years and upon which beliefs are built – shape not just what ICT they use and how they use it, but importantly, how the teacher conceives that ICT contributes to living-out their lives in accordance with those values. The language that the teacher uses and the relational nature of discourse about ICT becomes revealing both about what ICT the teacher uses in their teaching practices, as well as what they choose not to engage with. Ertmer and Ottenbreit-leftwich (2014) argued that core beliefs are functionally connected to other beliefs and because of those connections with other beliefs are the most difficult to change. This is an important point for those seeking to influence changes to ICT practices to consider given that this study aligns with others which have argued such belief systems influence how teachers use ICT in teaching practices (Section 2.3). Further research should be undertaken to better understand the friction between the tools used to attempt to change teacher's ICT practices (e.g. frameworks, policies, training), and the likelihood of any tool being successful if it does not align with the individual teacher's beliefs. As Twining (2002a) argued, studies will benefit from describing practice without applying value-based judgements about the quality and nature of that practice.

The literature in Chapter 2 was synthesised into the Funnels of Influence model (Section 2.4.3) which was used to inform data generation and analysis. In Chapter 5 the discussion-based response to RQ3 foregrounded the way in which the teacher's Funds of Knowledge and Identity shaped their Growth and thus the lens through which they later espoused, intended and enacted practices. In other words, that the Funnel of Influences from The Self creates a lens through which the Funnels of Influence from The Context are viewed. It is that lens of the Substantial Self which dominates what follows.

Therefore, a revised version of the Funnels of Influence is presented in Figure 6.1 as part of a contribution to those addressing uses of ICT in teaching practices.

Figure 6.1: Revised Funnels of Influence model



A summary of each conceptualisation within the Funnels of Influence model (as originally set out in Section 2.4.3), can be found in Appendix R.

It is briefly worth recalling the relationship between teachers and their schools in light of the revised Funnels of Influence model. For example, Teacher 3 had chosen School B because it offered a perceived safe haven from issues experienced in their two previous schools (Section 4.6.1) and Teacher 2 had chosen School A because it offered an

environment which encouraged professional learning (Section 4.4.1). The choice of school itself could therefore be interpreted as an enactment of the teacher's broad intentions. In other words; they perceived (whether consciously or not), their chosen school as the place where they would be able to enact their implicit beliefs. This supports the reframing of the role of The Context within the Funnels of Influence model; suggesting that access to the enduring features of the school Arena (influences that attracted the teacher to 'that' school) are a consequence of teacher's previous experiences (Growth). The school Arena itself – the enduring features - in being part of the Funnel of Influence from The Context, is therefore only a small influence relative to influences stemming from The Self – influences which result in the lens of the Substantial Self. It is likely that the lens of the Substantial Self results in practices which perpetuate the bidirectional loop between [espoused, intended and enacted] practices and the teacher's Growth; specific to how they perceive the school on an ongoing basis. This is another important point for those addressing the use of ICT in teaching practices; that the teacher's choice of school is likely to include a perception by the teacher about how they then live out their teaching practices – with all kinds of inferences within that about Agency, expectations, Opportunities and Possibilities. These may or may not align with changes that later affect the school including steps to address ICT use in teaching practices.

This study has been an exploration into the relationship between teacher's pedagogical stance and the uses of ICT in their teaching practices. The (revised) Funnels of Influence model, as set out above, offers a useful tool for those seeking to understand ICT in teaching practices meaningfully in future.

Furthermore, in order to understand how and why ICT is being used in teaching practices, it is necessary to understand the teacher, not just their teaching – the ways in which they have internalised previous experiences and the consequences that has on how they perceive today's experiences. The Funnels of Influence model conceptualises the different influences affecting the teacher's espoused, intended, enacted and thus implicit pedagogical stance.

In addition, The Pedagogical Framework (Table 2.2) played a central role in this study as a tool for describing teacher's pedagogical stance. Those supporting teachers with reflective discussion about their teaching may similarly find it beneficial to use The Pedagogical Framework as a tool for prompting, probing and discussing the nature of teaching and learning as part of wider improvement strategies.

Finally, whilst the influences from a teacher's context – the school they work within - are important, it is the teacher's perception of those influences that matter. Teachers' perception of their school and what Opportunities and Agency it affords them may manifest themselves differently even within what appears to be consistent practice. For

those seeking to disseminate ‘good practice’ within and across schools – even when schools and teachers appear aligned or when the physical room and equipment is the same - it is important to recognise that whilst actions and processes may appear similar, the practice itself is unlikely to be the same. Therefore, it is unlikely that teachers will be replicating the same experiences for the children. Consequently, the impact on learning or engagement is also unlikely to be the same. The sharing of ‘good practice’ across the profession may benefit from explicitly aligning practices with specific framing of particular pedagogical models and intended impact on learners.

Each of these points signposts the gap in literature concerned with ICT in teaching practices. As set out by Selwyn (2020) existing literature tends to depend upon quantitative studies, self-reporting and surface level observations (see Section 2.2.2). This leads to an over reliance on quantitative data and its limitations; constraining perspectives and distracting or preventing researchers from focusing on what does happen (as opposed to what could happen). This study calls for future work to probe far deeper into teacher’s practices in order to re-energise the debate about how to realise greater benefits from what ICT can offer to teaching and learning.

This study also makes a methodological contribution to those with an interest in teacher’s practice within and beyond ICT; offering both academic research and professional development a more robust means of analysis. Specifically, by utilising theories drawn from discourse analysis, a more robust unpacking of teacher’s espoused, intended, enacted and implicit pedagogical stances can take place. For example, as exemplified in Chapters 3 and 4, by considering Framing Theory (Nelson, Oxley and Clawson, 1997), Dialogic Undertones (Hodges, 2015) and Centering Theory (Walker, Joshi and Prince, 1998), this study surfaced greater precision about teacher’s espoused and implicit conceptualisations and the friction between them. This forensic approach to data analysis made it possible to distinguish between teacher-centric or learner-centric framing of the teacher’s pedagogical stance. This subtle yet important distinction can profoundly affect the nature of relationships, language, behaviours and decisions by the teacher, and therefore directly impacts children’s experiences of teacher practice – a vital consideration in both theory and professional practice and extending well beyond the field of ICT.

6.2 Limitations of this study

There are some limitations within this study which are now discussed in turn. RQ1 was concerned with surfacing the teacher’s pedagogical stance. However, the teachers themselves were not asked explicitly to identify it, nor were they given sight of The Pedagogical Framework (which was used within the analysis of RQ1), to self-identify themselves. This was intentional. As Beltman et al. (2015) argued, teacher’s identities are not simply who they say they are. Furthermore, in a high accountability stakes culture

(Buchanan, 2015), desirability bias is a known issue amongst teachers (Goe, Bell and Little, 2008; Coe et al., 2014). As such, asking a teacher to align themselves using a document which has left-to-right columns (a format which in schools tends to infer progression), was thought to be likely to bias espoused data. Furthermore, by surfacing specific aspects of models of pedagogy, it was thought that teachers may also change their espoused intentions and their enacted practices in order to be seen to align with particular models.

The scale of this study necessitated limiting the number of cases and volume of data generated. Given the duration of an EdD, and the depth of probing required by the methodology of this study, pragmatic decisions were made. These could be approached differently were this study to be repeated over a longer timeframe or with more researchers involved. For example, future studies could probe all teachers within a given school or all teachers in all schools across a given Trust.

Furthermore, relating to the scale of this study, a huge amount of literature has been drawn upon which surfaces many different issues relating to teachers and teaching, drawing on a number of fields spanning education, technology, discourse, sociology and psychology. There are limitations for any researcher about what was known prior to commencing studies and what can be absorbed, assimilated and synthesised during the course of a professional part time doctorate, balanced with a busy home life. Thus, some lines of enquiry will benefit from further probing – for example, a better understanding of the cultural and social values that teachers are born into and how these influence childhood experiences of teachers and schooling. Those childhood experiences are known to affect how teacher's form their own pedagogical stance (Chang-Kredl and Kingsley, 2014) and as such are likely to be important considerations when considering how that pedagogical stance and its framing impacts the use of ICT in teaching practices.

6.3 Implications for theory and practice of education

There are a number of stakeholders who would like to see ICT used in ways that make a greater impact on learning (e.g. children, families, teachers and school leaders, policy makers, industry suppliers). Each of these have different interests and are likely to frame their own pedagogical stances differently. This makes it difficult for a teacher to know who to listen to and where to obtain support from.

It may be helpful for teachers, leaders, advisors and suppliers to consider using The Pedagogical Framework in conversations about how ICT is used; as a tool to prompt targeted discussion about pedagogy and practice. This kind of professional dialogue would require scaffolding and so The Pedagogical Framework – specifically designed for the context of understanding ICT in teaching practices within an academic study – may benefit from supporting materials that would facilitate practitioner discussions.

Furthermore, the Funnels of Influence model is offered as means to unpick and unpack what teachers espouse, intend and enact in relation to ICT in teaching practices, and would benefit from supporting materials to bridge the gap between its theoretical origins and methodological use, to becoming a practical tool for use within teacher development.

There are considerations for those leading ICT at scale (e.g. headteachers, trust leaders, advisors, policy makers and ICT product leaders). First, in understanding their own pedagogical stance and how it may impact the way in which experiences are perceived and messages are communicated. Second, in setting out a vision for ICT use in teaching practices, how that pedagogical stance aligns or is in friction with those who are expected to be part of that vision. INSET discussions, policy consultations and think tanks are unlikely to surface sufficient detail about the framing of individual pedagogical stance amongst those present. As seen within this study, it is entirely possible for two teachers to enact the same ICT processes or actions, but for very different reasons and as such creating very different experiences for the learners. For those setting out a vision concerned with ICT, this matter is absolutely vital to address. If the learner's experience does not match the leadership vision, then the vision is not addressing what it purports to address. Third, for those designing, building, distributing, implementing and supporting ICT through industry, recognising all of the above is critical and important to make transparent both to internal staff as well as to school customers, as it affects what is created, how it is communicated and its likeliness to make an impact on learning. Explanations of the different ways that particular ICT can align with different pedagogical models helps teacher be better informed about how they might use ICT to enhance their desired pedagogical approach. Those explanations are only possible through a detailed understanding of the intricacies of an ICT product.

6.4 Dissemination

Extracts from this study will be submitted to peer-reviewed journals in order to initiate dialogue with other researchers; seeking to combine, compare, contrast and extend findings. In addition, an EdD, as a professional doctorate, takes place in a landscape where the subject matter is also part of the researchers day-to-day working life. Consequently, findings and discussion have been, and will continue to be debated and disseminated through the course of professional dialogue. The recommendations from this thesis will be taken to future meetings with school leaders, policy makers and ICT suppliers through existing and new networks and communication channels. Furthermore, they will be discussed with teachers and students through the course of my own teaching and consulting practices. It is hoped that this study, its contribution to the field and the implications for policy and practice will become enacted through those discussions, networks and channels over the coming months and years.

6.5 Final words

It is right that the study should close with an ethical reflection on the whole study. The teachers in this study gifted their words and actions to this research, and furthermore to the teaching profession through the contribution that this study offers. This study has argued that each individual teacher needs to be recognised and understood for who they are. By understanding the uniqueness of each teacher, the profession is better able to grow as a whole. To use a metaphor, it is through a recognition that a beach is made up from individual grains of sand, the sea and the sky, that the whole seascape becomes understood.

References

Abercrombie, M. L. J. (1993) *The Anatomy of Judgement: an Investigation into the Processes of Perception and Reason*. Harmondsworth: Penguin.

Abernethy, M. (2015) 'Self-reports and Observer Reports as Data Generation Methods: An Assessment of Issues of Both Methods', *Universal Journal of Psychology*, 3(1), pp. 22–27.

Aldosemani, T. (2019) 'Inservice Teachers' Perceptions of a Professional Development Plan Based on SAMR Model: A Case Study', *The Turkish Online Journal of Educational Technology*, 18(3), pp. 46–53.

Alexander, R. (2008) 'Pedagogy, Curriculum and Culture', in *Pedagogy and Practice: Culture and Identities*. London: Sage.

Alexander, R. (2009) 'Towards a Comparative Pedagogy', in Cowen, R. . and Kazamias, A. M. . (eds) *International Handbook of Comparative Education*. Springer, pp. 923–942.

Alt, D. (2015) 'College students' academic motivation, media engagement and fear of missing out', *Computers in Human Behavior*, 49, pp. 111–119.

Aluwihare-Samaranayake, D. (2012) 'Article Ethics in Qualitative Research: A View of the Participants' and Researchers' World from a Critical Standpoint', *International Journal of Qualitative Methods*, 11(2), pp. 64–81.

Apple (2020) *Apple Teacher*. Available at: https://www.apple.com/uk/education/k12/apple-teacher/ (Accessed: 27 June 2020).

Askew, M. *et al.* (1997) *Effective Teachers of Numeracy: Report of a study carried out for the Teacher Training Agency.* London.

Atkins (2015) *Literature Review on the Impact of Digital Technology on Learning and Teaching*. Edinburgh.

Aubrey-Smith, F. (2007) *How the implementation of a Virtual Learning Environment (VLE) can affect the strategic development of a whole school. MA (Ed) Thesis*. Winchester, University of Winchester.

Beach, D. and Eriksson, A. (2010) 'The relationship between ethical positions and methodological approaches: a Scandinavian perspective', *Ethnography and Education*, 5(2), pp. 129–142.

Beauchamp, C. and Thomas, L. (2009) 'Understanding teacher identity: An overview of issues in the literature and implications for teacher education', *Cambridge Journal of Education*, 39(2), pp. 175–189.

Becker, H. J. and Riel, M. M. (1999) 'Teacher Professionalism and the Emergence of Constructivist-Compatible Pedagogies.', in *American Educational Research Association*. Montreal, pp. 1–71.

Beckman, K. *et al.* (2018) 'Conceptualising technology practice in education using Bourdieu's sociology', *Learning, Media and Technology*, 43(2), pp. 197–210.

Beckman, K., Bennett, S. and Lockyer, L. (2019) 'Reproduction and transformation of students' technology practice: The tale of two distinctive secondary student cases', *British Journal of Educational Technology*, 50(6), pp. 3315–3328.
British Educational Commnications and Technology Agency (2008) *Harnessing Technology Review 2008: The role of technology and its impact on education*. Coventry, Becta.
British Educational Communications and Technology Agency (2009) *Becta: Our work, its impact*. Coventry.
Beijaard, D., Meijer, P. C. & Verloop, N. (2004) 'Reconsidering research on teachers' professional identity', *Teaching and Teacher Education*, 20(2), pp. 107-128.
Beijaard, D., Verloop, N. and Vermunt, J. D. (1999) 'Teachers' perceptions of professional identity: An exploratory study from a personal knowledge perspective.', *Teaching and Teacher Education*, 1, pp. 749–764.
Beltman, S. *et al.* (2015) 'Drawing identity: Beginning pre-service teachers' professional identities', *Issues in Educational Research*, 25(3), pp. 225–245.
Bengtsson, T. T. and Fynbo, L. (2018) 'Analysing the significance of silence in qualitative interviewing: questioning and shifting power relations', *Qualitative Research*, 18(1), pp. 19–35.
British Educational Research Association (2018) *Ethical Guidelines for Educational Research 4th Edition*. London.
Berger, R. (2015) 'Now I see it, now I don't: researcher's position and reflexivity in qualitative research', *Qualitative Research*, 15(2), pp. 219–234.
British Educational Suppliers Association (2017) *How the impact of education technology is currently measured in the classroom*. London.
British Educational Suppliers Association (2018) *EdTech in English Maintained Schools*. London.
British Educational Suppliers Association (2020a) *Insights Archive*. Available at: https://www.besa.org.uk/insights/?category=research (Accessed: 24 June 2020).
British Educational Suppliers Association (2020b) *Key UK education statistics*. London. Available at: https://www.besa.org.uk/key-uk-education-statistics/ (Accessed: 6 January 2020).
Bhattacharya, K. (2017) *Fundamentals of Qualitative Research*. New York: Routledge.
Bien, A. and Selland, M. (2018) 'Living the stories we tell: The sociopolitical context of enacting teaching stories', *Teaching and Teacher Education*, 69, pp. 85–94.
Birney, R. C. and Teevan, R. C. (1961) *Instinct: an enduring problem in psychology*. Princeton NJ: Van Nostrand.
Bogdan, R. C. and Biklen, S. K. (2003) *Qualitative Research for Education: An introduction to Theories and. Methods*. 4th edn. New York: Pearson Education.
Bourdieu, P. (1977) *Outline of a Theory of Practice*. London: Cambridge University Press.

Bourdieu, P. (1984) *Distinction: A Social Critique of the Judgement of Taste (Translated by Richard Nice)*. Cambridge, Massachusetts: Harvard University Press.
Bourdieu, P. (1986) 'The Forms of Capital', in Richardson, J. (ed.) *Handbook ofTheory and Research for the Sociology ofEducation*. Connecticut: Greenwood Press, pp. 241–256.
Bourdieu, P. and Wacquant, L. J. D. (1992) *An Invitation to Reflexive Sociology*. Chicago: University of Chicago Press.
Bria, F. *et al.* (2015) *Identity Ecosystem: Decentralised Citizens Engagement Technologies*. London.
Buabeng-Andoh, C. (2012) 'Factors influencing teachers' adoption and integration of information and communication technology into teaching: A review of the literature', *International Journal of Education and Development using Information and Communication Technology*, 8(1), pp. 136–155.
Buchanan, R. (2015) 'Teacher identity and agency in an era of accountability', *Teachers and Teaching: Theory and Practice*, 21(6), pp. 700–719.
Burgess, R. G. (1990) *In the field : an introduction to field research*. London: Routledge.
Burnett, C. (2016) *The Digital Age and Its Implications for Learning and Teaching in the Primary School*, *Cambridge Primary Review Trust Research Survey*. Cambridge: Pearson.
Carney, D. R., Cuddy, A. J. C. and Yap, A. J. (2010) 'Power Posing: Brief Nonverbal Displays Affect Neuroendocrine Levels and Risk Tolerance', *Psychological Science*, 21(10), pp. 1363–1368.
Carr, N. (2010) *The Shallows: How the internet is changing the way we think, read and remember*. London: Atlantic.
Carver, L. (2016) 'Teacher Perception of Barriers and Benefits in K-12 Technology Usage', *The Turkish Online Journal of Educational Technology*, 15(1), pp. 110–116.
Castells, M. (2015) 'The Impact of the Internet on Society: A Global Perspective', in Benkler, Y. (ed.) *Change: 19 Key Essays on How the Internet is Changing Our Lives*. 6th edn. Bilbao: BBVA Open Mind, pp. 127–148.
Chamberlain, E. M. (2015) *Exploring the out-of-schol writing practices of three children aged 9 - 10 years old and how these practices travel across and within the domains of home and school. EdD Thesis.* The Open University.
Chang-Kredl, S. and Kingsley, S. (2014) 'Identity expectations in early childhood teacher education: Pre- service teachers' memories of prior experiences and reasons for entry into the profession', *Teaching and Teacher Education*, 43, pp. 27–36.
Chen, J. (2016) 'Understanding teacher emotions: The development of a teacher emotion inventory', *Teaching and Teacher Education*, 55, pp. 68–77.
Chong, S. & Low, E. (2009) 'Why I want to teach and how I feel about teaching - formation of teacher identity from pre-service to the beginning teacher phase.', *Educational*

Research for Policy and Practice, 8(1), pp. 59–72.
Christodoulou, D. (2020) *Teachers vs Tech?: The case for an ed tech revolution*. Oxford: Oxford University Press.
Clark, W. and Luckin, R. (2013) 'What the research says: iPads in the Classroom', *London Knowledge Lab*, pp. 1–31.
Coe, R. *et al.* (2014) *What makes great teaching? Review of the underpinning research*. Durham.
Coe, R. *et al.* (2020) *Evidence Review Great Teaching Toolkit*. Evidence Based Education. Cambridge.
Cohen, L., Manion, L. and Morrison, K. (2000) *Research Methods in Education*. 7th edn. Oxon: Routledge Falmer.
Collins, A. and Halverson, R. (2010) 'The second educational revolution: Rethinking education in the age of technology', *Journal of Computer Assisted Learning*, 26(1), pp. 18–27.
Condie, R. *et al.* (2007) *The impact of ICT in schools: a landscape review*. Coventry.
Cooper, K. and Olson, M. R. (1996) 'The multiple "I's" of teacher identity.', in Kompf, M. et al. (eds) *Changing research and practice: Teachers' professionalism, identities and knowledge*. London: Falmer Press, pp. 78–89.
Corbetta, P. (2003) 'Participant Observation', in *Social Research: Theory, Methods and Techniques*. London: Sage, pp. 235–263.
Costa, C., Hammond, M. and Younie, S. (2019) 'Theorising technology in education: an introduction', *Technology, Pedagogy and Education*, 28(4), pp. 395–399.
Cox, M. *et al.* (2003) *A review of the research literature relating to ICT and attainment*. Coventry.
Creswell, J. W. and Creswell, J. D. (2018) *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. 5th edn. London: Sage Publications.
Cruickshank, J. (2012) 'The Role of Qualitative Interviews in Discourse Theory', *Critical Approaches to Discourse Analysis across Disciplines*, 6(1), pp. 38–52.
Data, Analysis and Insight for School Improvement (2019) *Ofsted Inspections - Good Schools - Disadvantaged Pupils*. Nottingham.
Darvin, R. and Norton, B. (2015) 'Identity and a model of investment in applied linguistics', *Annual Review of Applied Linguistics*, 35, pp. 36–56.
Davidson, C. (2009) 'Transcription: Imperatives for Qualitative Research', *International Journal of Qualitative Methods*, 8(2), pp. 35–52.
Davitt, J. (2005) *New Tools for Learning: accelerated learning meets ICT*. Stafford: Network Educational Press Ltd.
Department for Children, Schools and Families (2009) *Your child, your schools, our future: Building a 21st century schools system*. DCSF. London.
Department for Education (2013) *Consultation report: Changing ICT to Computing in the*

National Curriculum. London.
Department for Education (2019) *Realising the potential of technology in education: A strategy for education providers and the technology industry*. London.
Department for Education and Skills (2005) *Harnessing Technology*. London.
European Commission (2013) *Survey of schools: ICT in education, final study report: benchmarking access, use and attitudes to technology in Europe's schools*. Brussels.
European Commission (2019) *2nd Survey of Schools: ICT in Education: Shaping Europe's digital future*. Brussels.
Eddles-Hirsch, K. (2015) 'Phenomenology and educational research', *International Journal of Advanced Research*, 3(8), pp. 251–260.
Educate (2020) *Buying the right EdTech for your school*. Available at: https://www.educateventures.com/all-other-downloads (Accessed: 27 June 2020).
Ephratt, M. (2008) 'The functions of silence', *Journal of Pragmatics*, 40(11), pp. 1909–1938.
Ertmer, P. A. (2005) 'Teacher pedagogical beliefs: the final frontier in our quest for technology integration?', *Educational Technology Research and Development*, 53(4), pp. 25–39.
Ertmer, P. A. and Ottenbreit Leftwich, A. (2010) 'Teacher Technology Change: How Knowledge, Confidence, Beliefs, and Culture Intersect', *Journal of Research on Technology in Education*, 42(3), pp. 255–284.
Esteban-Guitart, M. and Moll, L. C. (2014) 'Funds of Identity : A new concept based on the Funds of Knowledge approach', *Culture and Psychology*, 20(1), pp. 31–48.
Facer, K. (2011) *Learning Futures: Education, technology and social change*. Oxon: Routledge.
Falloon, G. (2015) 'What's the difference? Learning collaboratively using iPads in conventional classrooms', *Computers and Education*, 84, pp. 62–77.
Frank, M., Roehrig, P. and Pring, B. (2014) *Code Halos: How the Digital Lives of People, Things and Organizations Are Changing the Rules of Business*. London: John Wiley & Sons.
Fullan, M. (2020) *Leading in a culture of change*. 2nd edn. San Francisco: Jossey-Bass.
FutureLab (2009) *Children's role in home-school relationships and the role of digital technologies: A literature review*. Slough.
Garfinkel, H. (1967) *Studies in Ethnomethodology*. New Jersey: Prentice Hall.
Garnham, B. (2008) 'Data Generation', in Given, L. M. (ed.) *The Sage Encyclopedia of Qualitative Research Methods*. Thousand Oaks: Sage, pp. 192–193.
Geertz, C. (1973) 'Thick Description: Toward an Interpretive Theory of Culture', in *The Interpretation of Cultures: Selected Essays*. New York: Basic Books, pp. 3-30.
Gil-Flores, J., Rodríguez-Santero, J. and Torres-Gordillo, J.-J. (2017) 'Factors that explain the use of ICT in secondary-education classrooms: The role of teacher characteristics and

school infrastructure', *Computers in Human Behavior*, 68, pp. 441–449.
Glaser, B. G. and Strauss, A. L. (1967) *The Discovery of Grounded Theory: Strategies for qualitative research*. New York: Aldine DeGruyter.
Gobbo, C. and Girardi, M. (2001) 'Teachers' beliefs and integration of information and communications technology in Italian schools', *Journal of Information Techology for Teacher Education*, 10(1–2), pp. 63–85.
Goe, L., Bell, C. and Little, O. (2008) *Approaches to evaluating teacher effectiveness: A research synthesis*, *National Comprehensive Center for Teacher Quality*. Washington, DC.
González-Sanmamed, M., Sangrà, A. and Muñoz-Carril, P. C. (2017) 'We can, we know how. But do we want to? Teaching attitudes towards ICT based on the level of technology integration in schools', *Technology, Pedagogy and Education*, 26(5), pp. 633–647.
Google (2020) *Creating a Culture of Innovation*. Available at: https://docs.google.com/document/d/1DweU5qL56uNbQILnoxwL21idbbEIYLls6EAkIKKPmdU/edit (Accessed: 27 June 2020).
Grbich, C. (2013) *Qualitative Data Analysis: An Introduction*. London: Sage.
Green, J. *et al.* (2007) 'Generating best evidence from qualitative research: the role of data analysis', *Australian and New Zealand Journal of Public Health*, 31(6), pp. 545–550.
Grimmer, J. . (2016) *Experts vs. Friends: The Definitive Guide to Who Influences Us and Why*, *Medium*. Available at: https://medium.com/bestcompany/experts-vs-friends-the-definitive-guide-to-who-influences-us-and-why-6a0aa609c8c0 (Accessed: 28 June 2020).
Guba, E. G. and Lincoln, T. S. (1994) 'Competing paradigms in qualitative research', in Denzin, N. K. and Lincoln, Y. S. (eds) *Handbook of qualitative research*. Thousand Oaks, CA: Sage, pp. 105–117.
Gudmundsdóttir, G. B. *et al.* (2014) 'Interactive technology. Traditional practice?', *Nordic Journal of Digital Literacy*, 9(1), pp. 23–43.
Gurung, B. and Rutledge, D. (2014) 'Digital learners and the overlapping of their personal and educational digital engagement', *Computers & Education*, 77, pp. 91–100.
Halstead, J. M. and Taylor, M. J. (2000) *The Development of Values, Attitudes and Personal Qualities: A Review of Recent Research*. Slough.
Hamachek, D. (1999) 'Effective Teachers: What They Do, How They Do It, and the Importance of Self-Knowledge', in Lipka, Richard, P. and Brinthaupt, Thomas, M. (eds) *The Role of Self in Teacher Development*. New York: State University of New York Press.
Hammersley, M. (1995) *The Politics of Social Research*. London: Sage Publications.
Hammersley, M. and Atkinson, P. (2010) *Ethnography: principles in practice*. Abingdon: Routledge.
Hammersley, M., Foster, P. and Gomm, R. (2000) 'Case study and generalisation', in Gomm, R., Hammersley, M., and Foster, P. (eds) *Case Study Method: Key Issues, Key Texts*. London: Sage, pp. 98–115.

Hammond, M. (2014) 'Introducing ICT in schools in England: Rationale and consequences', *British Journal of Educational Technology*, 45(2), pp. 191–201.
Hammond, M. (2020) 'What is an ecological approach and how can it assist in understanding ICT take-up?', *British Journal of Educational Technology*, 51(3), pp. 853–866.
Haney, J. J. *et al.* (2002) 'From beliefs to actions: The beliefs and actions of teachers implementing change', *Journal of Science Teacher Education*, 13, pp. 171–187.
Hargreaves, A. and Fullan, M. (2012) *Professional Capital: Transforming Teaching in Every School*. New York: Teachers College Press.
Hattie, J. (2004) *Models of Self-Concept that are Neither Top-Down or Bottom-Up: The Rope Model of Self-Concept*.
Hattie, J. (2019) *Hattie effect size list - 256 Influences Related To Achievement*. Available at: https://visible-learning.org/hattie-ranking-influences-effect-sizes-learning-achievement/ (Accessed: 22 October 2019).
Hattie, J. and Hamilton, A. (2020) *Why We Focus on the Wrong Drivers in Education*. London: Sage Publications Ltd.
Hawkes, N. (2010) *Does Teaching Values Improve the Quality of Education in Primary Schools? A Study about the Impact of Introducing Values Education in a Primary School.* VDM Publishing House.
Heitink, M. *et al.* (2016) 'Teachers' professional reasoning about their pedagogical use of technology', *Computers and Education*, 101, pp. 70–83.
Hennessy, S., Ruthven, K. and Brindley, S. (2005) 'Teacher perspectives on integrating ICT into subject teaching: Commitment, constraints, caution, and change', *Journal of Curriculum Studies*, 37(2), pp. 155–192.
Hennick, M., Hutter, I. and Bailey, A. (2011) *Qualitative Research Methods*. London: Sage.
Hew, K. and Brush, T. (2007) 'Integrating technology into K–12 teaching and learning: Current knowledge gaps and recommendations for future research', *Educational Technology Research & Development*, 55(3), pp. 223– 252.
Higgins, S. (2003) *Does ICT improve learning and teaching in schools? A professional user review of UK research undertaken for the British Educational Research Association*. Newcastle.
Higgins, S. (2010) 'The impact of interactive whiteboards on classroom interaction and learning in primary schools in the UK', in Thomas, M. and Schmid, E. C. (eds) *Interactive Whiteboards for Education: Theory, Research and Practice InformatIon sclence reference*. Hershey, PA: IGI Global, pp. 86–101.
Higgins, S. and Moseley, D. (2007) 'Teacher Development Teachers' thinking about information and communications technology and learning: beliefs and outcomes', *Teacher Development*, 5(2), pp. 191–210.

Higgins, S., Xiao, Z. and Katsipataki, M. (2012) *The Impact of Digital Technology on Learning : A Summary for the Education Endowment Foundation Full Report*. London.
Hill, D. (2003) 'Tell me no lies: Using science to connect with consumers', *Journal of interactive marketing*, 17(4), pp. 61–72.
Hill, M. (2005) 'Ethical considerations in researching children's experiences', in Greene, S. and Hogan, D. (eds) *Researching children's experiences: methods and approaches.* London: Sage.
Hodges, A. (2015) 'Intertextuality in Discourse', in Tannen, D., Hamilton, H. E., and Schiffrin, D. (eds) *The Handbook of Discourse Analysis*. 2nd edn. US: Wiley-Blackwell.
Horn, I. S., Nolen, S. B., Ward, C. J. & Campbell, S. S. (2008) 'Developing practices in multiple worlds: The role of identity in learning to teach.', *Teacher Education Quarterly*, 35(3), pp. 61–72.
Hoskin, R. (2012) 'The dangers of self-report', *Science Brainwaves*. Available at: https://www.sciencebrainwaves.com/the-dangers-of-self-report/ (Accessed: 17 July 2020).
Hurlburt, R. and Heavey, C. (2006) *Exploring Inner Experience: The descriptive experience sampling method*. Philadelphia: John Benjamins.
Husbands, C. and Pearce, J. (2012) *What makes great pedagogy ? Nine claims from research*. London.
Husu, J. and Tirri, K. (2007) 'Developing whole school pedagogical values-A case of going through the ethos of "good schooling"', *Teaching and Teacher Education*, 23(4), pp. 390–401.
Hyett, N., Kenny, A. and Dickson-Swift, V. (2014) 'Methodology or method: a critical review of qualitative case study reports', *International Journal of Qualitative Studies on Health and Well-being*, 9(1).
Israel, M. (2015) *Research Ethics and Integrity for Social Scientists: Beyond Regulatory Compliance*. 2nd edn. London: Sage.
Jenks, C. J. (2018) 'Recording and Transcribing Social Interaction In: The SAGE Handbook of Qualitative Data Collection Recording and Transcribing Social Interaction'.
Jerrim, J. and Sims, S. (2019) *The Teaching and Learning International Survey (TALIS) 2018*. Paris.
Jewitt, C. *et al.* (2010) *School use of learning platforms and associated technologies*. Coventry.
John, P. (2005) 'The sacred and the profane: Subject sub-culture, pedagogical practice and teachers' perceptions of the classroom uses of ICT', *Educational Review*, pp. 471–490.
John, P., la Velle, L. and Baggott, L. (2004) 'Devices and Desires: subject subcultures, pedagogical identity and the challenge of information and communications technology', *Technology, Pedagogy and Education*, 13(3), pp. 307–326.
Johnson, G. M. (2010) 'Internet use and child development: The techno-microsystem',

Australian Journal of Educational and Developmental Psychology, 10, pp. 32–43.
Jucker, A. H. and Smith, S. W. (1998) 'And people just you know like "wow": Discourse markers as negotiating strategies', in Jucker, A. H. and Ziv, Y. (eds) *Discourse Markers: Descriptions and Theory*. Philadelphia: John Benjamins, pp. 171–201.
Judson, E. (2006) 'How teachers integrate technology and their beliefs about learning: Is there a connection?', *Journal of Technology and Teacher Education*, 14, pp. 581–597.
Justo, A. (2019) *The knowns and unknowns framework for design thinking*, *UX Collective*. Available at: https://uxdesign.cc/the-knowns-and-unknowns-framework-for-design-thinking-6537787de2c5 (Accessed: 4 June 2020).
Kagan, D. M. (1992) 'Implications of Research on Teacher Belief', *Educational Psychologist*, 27(1), pp. 65–90.
Karaseva, A., Siibak, A. and Pruulmann-Vengerfeldt, P. (2015) 'Relationships between teachers` pedagogical beliefs, subject cultures, and mediation practices of students' use of digital technology', *Cyberpsychology*, 9(1).
Kennedy, B. L. (2018) 'Deduction, Induction, and Abduction', in Flick, U. (ed.) *The SAGE Handbook of Qualitative Data Collection*, pp. 49–64.
Kenneth, F. H. (2000) 'Recognising deductive processes in qualitative research', *Qualitative Market Research: An International Journal*, 3(2), pp. 82–90.
Ko, J., Sammons, P. and Bakkum, L. (2014) *Effective Teaching*. Reading.
Kompa, J. S. (2018) *The TPCK Model of Technological Education: Explaining Everything, Achieving Little*.
Korthagen, F. A. J. (2004) 'In search of the essence of a good teacher: Towards a more holistic approach in teacher education', *Teaching and Teacher Education*, 20(1), pp. 77–97.
Kozma, R. B. and Kozma, R. B. (2003) 'Technology and Classroom Practices', *Journal of Research on Technology in Education*, 36(1), pp. 1–14.
Kvale, S. (1996) *An Introduction to Qualitative Research Interviewing*. Thousand Oaks, CA: Sage.
Lakoff, G. and Johnson, M. (1999) *Philosophy in the flesh : the embodied mind and its challenge to Western thought*. New York: Basic Books.
Lave, J. (1988) *Cognition in practice : mind, mathematics, and culture in everyday life*. Cambridge: Cambridge University Press.
Lave, J. and Wenger, E. (1991) *Situated learning: legitimate peripheral participation*. Cambridge: Cambridge University Press.
Lea, S. (2015) *Instinct, Environment and Behaviour*. Hove: Psychology Press.
Lee, M. and Finger, G. (2010) *Developing a Networked School Community: A Guide to Realising the Vision*. Victoria: ACER.
Lee, S. A. and Schallert, D. L. (2016) 'Becoming a teacher: Coordinating past, present, and future selves with perspectival understandings about teaching', *Teaching and*

Teacher Education, 56, pp. 72–83.
Light, D. and Pierson, E. (2012) 'The Impact of School Technology Infrastructure on Teachers' Technology Integration: A Survey in Thirteen Countries.', *Ubiquitous Learning: An International Journal*, 5(4), pp. 29–40.
Lincoln, Y. S. and Guba, E. G. (1985) *Naturalistic inquiry*. London: Sage Publications.
Luckin, R. *et al.* (2012) *Decoding Learning: The Proof, Promise and Potential of Digital Education*. Nesta. London.
Luckin, R. *et al.* (2016) *Intelligence Unleashed An argument for AI in Education*. London.
Luckin, R. (2018) *Enhancing Learning and Teaching with Technology: What the Research Says*. London: UCL Institute of Education Press.
Maher, D. and Twining, P. (2016) 'Bring your own device–a snapshot of two Australian primary schools', *Educational Research*, 59(1), pp. 73–88.
Maines, D. R. (1993) 'Narrative's Moment and Sociology's Phenomena: Toward a Narrative Sociology', *The Sociological Quarterly*, 34(1), pp. 17–38.
Mandal, F. B. (2014) 'Nonverbal Communication in Humans', *Journal of Human Behavior in the Social Environment*, 24, pp. 417–421.
Maslow, A. H. (1954) *Motivation and Personality*. New York: Harper & Row.
Matusov, E. (2007) 'In search of "the appropriate" Unit of analysis for sociocultural research', *Culture and Psychology*, 13(3), pp. 307–333.
Mead, G. H. (1934) *Mind, Self, and Society*. Chicago: University of Chicago Press.
Microsoft (2020) *Microsoft Educators and Showcase School program*. Available at: https://microsoftedu.eventcore.com/ (Accessed: 27 June 2020).
Miller, T. (2012) 'Reconfiguring research relationships', in Miller, T., Birch, M., Mauthner, M. and Jessop, J. (eds) (ed.) *Ethics in Qualitative Research*. 2nd editio. London: Sage Publications.
Mishra, P. and Koehler, M. J. (2006) 'Technological Pedagogical Content Knowledge (TPACK) Framework - Educational Technology', *Teachers College Record*, 108(6), pp. 1017–1054.
Mitra, S. (2014) 'The future of schooling: Children and learning at the edge of chaos', *Prospects*, 44(4), pp. 547–558.
Mitra, S. (2015) *The Future of Learning*. Available at: https://www.youtube.com/watch?v=y-e9WRMWcdI (Accessed: 8 June 2017).
Moane, F. (2019) 'Interweaving traditional and digital approaches: The development of blended learning at Sandringham School', *Journal of the Chartered College of Teaching*.
Moll, L. C. *et al.* (1992) 'Funds of Knowledge for Teaching: Using a Qualitative Approach to Connect Homes and Classrooms', *Theory Into Practice*, 31(2), pp. 132–141.
Moore Johnson, S. and Birkeland, S. (2003) 'The Schools That Teachers Choose', *Educational Leadership*, 60(8), pp. 20–24.
Morris, D. (2012) 'ICT and educational policy in the UK: are we on the way towards e-

maturity or on the road to digital disaster?', *Research in Teacher Education*, 2(2), pp. 3–8.
Morrow, S. L. (2005) 'Quality and trustworthiness in qualitative research in counseling psychology', *Journal of Counseling Psychology*, 52(2), pp. 250–260.
Mumtaz, S. (2000) 'Factors affecting teachers' use of information and communications technology: a review of the literature', *Journal of Information Techology for Teacher Education*, 9(3), pp. 319–342.
Murphy, P. (2008) 'Defining Pedagogy', in *Pedagogy and Practice: Culture and Identities*. London: Sage.
Naace (2018) *Naace: The Naace Self Review Framework*. Available at: https://www.naace.org.uk/si-srf.html (Accessed: 6 January 2020).
Nelson, T. E., Oxley, Z. M. and Clawson, R. A. (1997) 'Toward a psychology of framing effects', *Political Behavior*, 19(3), pp. 221–246.
Nesta (2020) *EdTech Innovation Testbed*. Available at: https://www.nesta.org.uk/project/edtech-innovation-testbed/ (Accessed: 27 June 2020).
National Foundation for Educational Research (2008) *Harnessing Technology: Schools Survey*. Coventry, Becta.
Nias, J. (1993) 'Changing Times, Changing Identities: Grieving for a lost self', in Burgess, R. G. (ed.) *Educational Research and Evaluation: For Policy and Practice?* London: The Falmer Press, pp. 139–156.
Niederhauser, D. S. and Stoddart, T. (2001) 'Teachers' instructional perspectives and use of educational software', *Teaching and Teacher Education*, 17(1), pp. 15–31.
Nykvist, S. and Mukherjee, M. (2016) 'Who am I? Developing Pre-service Teacher Identity in a Digital World', *Procedia - Social and Behavioral Sciences*, 217, pp. 851–857.
Organisation for Economic Co-operation and Development (2009) *Creating Effective Teaching and Learning Environments: First Results from TALIS*. Paris: OECD Publishing.
Office for Standards in Education(2011) *ICT in schools 2008-11: An evaluation of information and communication technology education in schools in England 2008-2011*. London.
Office for Standards in Education (2019) *School Inspection Handbook*. London.
Oliver, D. G., Serovich, J. M. and Mason, T. L. (2005) 'Constraints and Opportunities with Interview Transcription: Towards Reflection in Qualitative Research', *Soc Forces*, 84(2), pp. 1273–1289.
Olsen, B. (2008) 'Introducing teacher identity and this volume', *Teacher Education Quarterly*, 35(3), pp. 3–4.
Orlikowski, W. (2010) 'The sociomateriality of organisational life: considering technology in management research', *Cambridge Journal of Economics*, 34(1), pp. 125–141.
Orlikowski, W. and Scott, S. (2008) 'Sociomateriality: challenging the separation of technology, work and organization', *Academy of Management Annals*, 2(1), pp. 433–474.
Oxford University Press (2017) *Oxford English Dictionary*. Oxford: Oxford University

Press.
Pajares, M. F. (1992) ‘Teachers’ Beliefs and Educational Research: Cleaning Up a Messy Construct’, *Review of Educational Research*, 62(3), pp. 307–332.
Pantic, N. (2017) ‘An exploratory study of teacher agency for social justice’, *Teaching and Teacher Education*, 66, pp. 219–230.
Passey, D. (2009) *Independent Evaluation of the Implementation of the Learning Platform LP+ across Schools*. Lancaster University, Lancaster.
Passey, D. (2011) ‘Implementing learning platforms into schools: an architecture for wider involvement in learning’, *Learning, Media and Technology*, 36(4).
Perry, C. and Ball, I. (2004) ‘Teacher Subject Specialisms and their Relationships to Learning Styles, Psychological Types and Multiple Intelligences: implications for course development’, *Teacher Development*, 8(1).
Pillen, M. T., Den Brok, P. J. and Beijaard, D. (2013) ‘Profiles and change in beginning teachers’ professional identity tensions’, *Teaching and Teacher Education*, 34, pp. 86–97.
Plowman, L. (2015) ‘Rethinking context: Digital technologies and children’s everyday lives’, *Children’s Geographies*.
Polman, J. L. (2010) ‘The zone of proximal identity development in apprenticeship learning’, *Revista de Educación*, 353, pp. 129–155.
Priestley, M., Biesta, G. and Robinson, S. (2015) *Teacher Agency: An ecological approach*. London: Bloomsbury.
Promethean (2020) *The State of Technology in Education 2019/20 Report*. Available at: https://resourced.prometheanworld.com/technology-education-industry-report/#landing (Accessed: 11 March 2020).
Puentedura, R. R. (2010) *SAMR and TPCK: Intro to Advanced Practice*. Available at: http://tinyurl.com/aswemayteach (Accessed: 9 August 2020).
Puentedura, R. R. (2013) ‘SAMR: Moving from enhancement to transformation’, in *2013 AIS ICT Management and Leadership Conference*. Available at: http://www.hippasus.com/rrpweblog/archives/2013/05/29/SAMREnhancementToTransformation.pdf.
Rashid, T. and Asghar, H. M. (2016) ‘Technology use, self-directed learning, student engagement and academic performance: Examining the interrelations’, *Computers in Human Behavior*, 63, pp. 604–612.
Rehm, M. and Notten, A. (2016) ‘Twitter as an informal learning space for teachers!? The role of social capital in Twitter conversations among teachers’, *Teaching and Teacher Education*, 60, pp. 215–223.
Reichertz, J. (2007) ‘Abduction: The logic of discovery in grounded theory’, in Bryant, A. and Charmaz, K. (eds) *The Sage handbook of grounded theory*. London: SAGE, pp. 214–228.
Riva, G. and Galimberti, C. (2001) *Towards cyberpsychology: mind, cognition, and society*

in the Internet Age. Amsterdam: IOS Press.
Roehrig, G. H., Kruse, R. A. and Kern, A. (2007) 'Teacher and school characteristics and their influence on curriculum implementation.', *Journal of Research in Science Teaching*, 44, pp. 883–907.
Rogers, C. and Scott, K. (2008) 'The development of the personal self and professional identity in learning to teach', in Cochran-Smith, M. et al. (eds) *Handbook of research on teacher education: Enduring questions and changing contexts*. New York: Routledge, pp. 732–755.
Rogers, R. *et al.* (2005) 'Critical Discourse Analysis in Education: A Review of the Literature', *Review of Educational Research*, 75(3), pp. 365–416.
Rogoff, B. (1990) *Apprenticeship in thinking: Cognitive development in social context*. New York: Oxford University Press.
Rossi, B. (2015) *30 years of technology in education: BESA report advises government on lessons learned*, *Information Age*. London.
Rowlands, I. *et al.* (2008) 'The Google generation: the information behaviour of the researcher of the future', *Aslib Proceedings*, 60(4), pp. 290–310.
Royal Society of Arts (2017) *After the reboot: computing education in UK schools*. London: RSA.
Ryan, T. G. (2018) 'Johari Window', in Frey, B. B. (ed.) *The SAGE Encyclopedia of Educational Research, Measurement, and Evaluation*. Thousand Oaks, CA: SAGE Publications, Inc., p. 909.
Saldaña, J. (2013) *The Coding Manual for Qualitative Researchers*. 2nd edn, *International Journal*. 2nd edn. London: SAGE Publications Ltd.
Schiffrin, D. (1987) *Discourse markers*. Cambridge: Cambridge University Press.
Schoen, L. T. (2011) 'Conceptual and Methodological Issues in Sociocultural Research and Theory Development in Education', in McInerney, D. M., Liem, G. A. D., and Walker, R. A. (eds) *Sociocultural Theories of Learning and Motivation: Looking Back, Looking Forward*. Charlotte, North Carolina: Information Age Publishing.
Schon, D. (1987) *Educating the Reflective Practitioner*. San Francisco: Jossey-Bass.
Segev, E. (2010) *Google and the Digital Divide: The bias of online knowledge*. Oxford: Chandos Publishing.
Selwyn, N. (1999) 'Differences in educational computer use: The influence of subject cultures', *International Journal of Phytoremediation*, 21(1), pp. 29–48.
Selwyn, N. (2011) *Education and Technology: Key Issues and Debates*. London: Continuum.
Selwyn, N. (2016) *Is Technology Good for Education?* Cambridge: Polity PressIs.
Selwyn, N. (2018) *Telling Tales on Technology: Qualitative Studies of Technology and Education*. 2nd edn. Oxon: Routledge.
Selwyn, N. *et al.* (2019) 'What's next for Ed-Tech? Critical hopes and concerns for the

2020s', *Learning, Media and Technology*, 9884.
Selwyn, N. and Kelchtermans, G. (2019) *The micropolitics of educational work*, *Meet the education researcher*.
Selwyn, N., Potter, J. and Cranmer, S. (2010) *Primary Schools and ICT: Learning from Pupil Perspectives*. London: Continuum.
Shaffer, D. W. (2017) *Quantitative ethnography*. Wisconsin: Cathcart Press.
Shibutani, T. (1988) 'Blumer's Contributions to Twentieth-Century Sociology', *Symbolic Interaction*, 11(1), pp. 23–31.
Stake, R. (1995) *The Art of Case Study Research*. London: Sage.
Sterne, J. (2003) 'Bourdieu, Technique and Technology', *Cultural Studies*, 17(3–4), pp. 367–389.
Stringer, E., Lewin, C. and Coleman, R. (2019) *Using Digital Technology to Improve Learning*. London.
Stutchbury, K. and Fox, A. (2009) 'Ethics in Educational Research: introducing a methodological tool for effective ethical analysis', *Cambridge Journal of Education*, 39(4), pp. 489–504.
Taber, K. S. (2011) 'Constructivism as educational theory: Contingency in learning, and optimally guided instruction', *Educational Theory*.
Taimalu, M. and Luik, P. (2019) 'The impact of beliefs and knowledge on the integration of technology among teacher educators: A path analysis', *Teaching and Teacher Education*, 79, pp. 101–110.
Teaching and Learning International Survey (2015) *Teaching in Focus: Teaching with Technology*. Paris.
Tannen, D. *et al.* (2015) *The Handbook of Discourse Analysis*. 2nd edn. Chichester: Blackwell.
The Open University (2017) *Research Ethics at the Open University*. Available at: http://www.open.ac.uk/research/ethics/human-research (Accessed: 10 June 2017).
Theocharis, Y. *et al.* (2015) 'Using Twitter to mobilize protest action: online mobilization patterns and action repertoires in the Occupy Wall Street, Indignados, and Aganaktismenoi movements', *Information, Communication & Society*, 18(2), pp. 202–220.
Thomas, G. and James, D. (2006) 'Re-inventing grounded theory: some questions about theory, ground and discovery', *British Educational Research Journal*, 32(6), pp. 767–795.
Thornberg, R. and Charmaz, K. (2014) 'Grounded theory and theoretical coding', in Flick, U. (ed.) *The SAGE Handbook of Qualitative Data Analysis*. London: Sage, pp. 153–169.
Timoštšuk, I., & Ugaste, A. (2012) 'The role of emotions in student teachers' professional identity.', *European Journal of Teacher Education*, 35(4), pp. 421–433.
Tondeur, J. *et al.* (2017) 'Understanding the relationship between teachers' pedagogical beliefs and technology use in education: a systematic review of qualitative evidence', *Educational Technology Research and Development*, 65(3), pp. 555–575.

Twining, P. (2002a) ‘Conceptualising computer use in education: Introducing the Computer Practice Framework (CPF)’, *British Educational Research Journal*, 28(1), pp. 95–110.
Twining, P. (2002b) *ICT in Schools Estimating the level of investment*. Milton Keynes.
Twining, P. *et al.* (2006) *Educational change and ICT: an exploration of Priorities 2 and 3 of the DfES e-strategy in schools and colleges*. Coventry: Becta.
Twining, P. (2008) ‘Framing IT use to enhance educational impact on a school-wide basis’, in Voogt, J. and Knezek, G. (eds) *International handbook of information technology in primary and secondary education*. Springer Science, pp. 555–577.
Twining, P., Browne, N., *et al.* (2017) *NP3: New Purposes, New Practices, New Pedagogy: Meta-analysis Report*. London: Society for Educational Studies.
Twining, P., Heller, R. S., *et al.* (2017) ‘Some guidance on conducting and reporting qualitative studies’, *Computers & Education*, 106, pp. A1–A9.
Underwood, J. (2009) *The impact of digital technology: a review of the evidence of the impact of digital technologies on formal education*. Coventry: British Educational Communications and Technology Agency.
Vanderlinde, R., Aesaert, K. and Van Braak, J. (2014) ‘Institutionalised ICT use in primary education: A multilevel analysis’, *Computers and Education*, 72, pp. 1–10.
Voogt, J. *et al.* (2013) ‘Technological pedagogical content knowledge: a review of the literature’, *Journal of Computer Assisted Learning*, 29(2), pp. 109–121.
Walker, M. A., Joshi, A. K. and Prince, E. F. (eds) (1998) *Centering theory in discourse*. Oxford: Clarendon Press.
van der Want, A. C. *et al.* (2017) ‘Changes over time in teachers’ interpersonal role identity’, *Research Papers in Education*, 2017, pp. 1470–1146.
Weatherby, K. and Clark-Wilson, A. (2019) ‘Getting inside the black box: Piloting and evaluating education technology in schools’, *Impact: Journal of the Chartered College of Teaching*, January, pp. 23–25.
Webb, M. and Cox, M. (2004) ‘A Review of Pedagogy Related to Information and Communications Technology’, *Technology, Pedagogy and Education*, 13(3), pp. 235–286.
Webster, A. *et al.* (2012) *What influences teachers to change their practice? A rapid research review*. Bristol: Centre for Understanding Behaviour Change.
Wells, D. (2014) ‘Embedding Information and Communication Technology across the curriculum- where are we at?’, *Research in Teacher Education*, 4(2), pp. 11–16.
Wenger, E. (2010) ‘Communities of practice and social learning systems: the career of a concept’, in Blackmore, C. (ed.) *Communities of practice and Social Learning Systems*. London: Springer-Verlag.
Whyley, D. *et al.* (2010) *The ADOPT Framework*. Wolverhampton. Available at: https://lpplus.com/the-adopt-framework/ (Accessed: 27 June 2020).
Wilson, J. (1990) *Politically Speaking: The Pragmatic Analysis of Political Language*.

Oxford: Basil Blackwell.
Yin, R. K. (2018) *Case Study Research: Design and Methods*. 6th edn. Los Angeles: Sage Publications.

Appendices

Appendix A: Initial contact to potential cases

[Sent in email format]

Dear [Insert Headteacher name]

I am writing to you to ask if it might be possible for your school / one of your schools [delete as appropriate] to be part of research that I am carrying out for my EdD (Doctor of Education) studies.

The research builds on the arguments that technologies have had a significant influence on human behaviours and interactions, which may then have influenced teacher's professional behaviours and thus pedagogies. The aim of the research is to explore how technology might be influencing teacher's espoused pedagogy and therefore their intended practice and enacted practice.

From a practical perspective, taking part in the research would mean my visiting your school to talk to 1-3 of your teachers and to observe them in action teaching. Some of the discussions – approximately 1.5hrs - will need to be during the school day which will necessitate their being out of class, but unfortunately there is no budget for this research and so I am not able to offer any funding to cover supply costs.

I have attached full details of the research for your review and would be very grateful if you would consider taking part. I do however understand the pressures on teacher's time and workload and will understand entirely if you feel that it is not appropriate at this time.

Warmest wishes,
Fiona

Appendix B: Informed Consent Information Sheets and Forms – School / Headteacher

School Information

Research title: To what extent is digital technology affecting teachers implicit and espoused pedagogical values and beliefs?

This EdD research is being carried out by Fiona-Aubrey Smith.

The research will involve the researcher visiting the school to interview teachers and observe lessons. Before that takes place the researcher and headteacher will need to have a discussion which will include;

- sharing information about the school's vision and organisation through a headteacher interview;
- reviewing the information about this research and clarifying any matters relating to it, including answering any questions;
- signing an informed consent form on behalf of the school;
- liaising about practicalities of the researcher's visit, including dates, times, equipment being used, locations for the interviews and observations.

For each teacher involved in the research, there will be a sequence of data collection:

1) an interview with the teacher for approximately 45 minutes;
2) a pre-observation interview of approximately 20 minutes;
3) observation of practice;
4) a post-observational interview of approximately 20 minutes.
5) Steps 2 to 4 will be repeated 3 to 5 times

To aid with data analysis the interviews and observations will be filmed. The recordings will focus on capturing the teacher throughout the observation and their interactions with the children. These recordings will be used solely as part of this research and are necessary to support thorough data analysis. They may be shared with Fiona's EdD supervisors and examiners for the purposes of analysis support but will not be shared with any other 3rd parties including the teacher's managers and employers. The recordings will be destroyed 5 years after completion of this research and will be kept securely and confidentially until their destruction. The researcher and her EdD supervisors will be the only people with access to the data including the films and still images, and the data will be kept in a locked cupboard and digital materials password protected.

The findings of the research will be published as an EdD thesis and there may also be further reports or papers published in print and online. Children, Teachers and Schools will be anonymised in any reports, images or recordings that are published as part of this research. Where the school or individuals are referred to it will be through the use of pseudonyms such as School A, Teacher 1, Child X. Where images are used in publications individuals will be pixelated/blurred and specific features which would enable recognition of the school will also be pixelated/blurred. However, due to the small number of participants (5) it may be possible that people who are familiar with the school or who are aware of the school's participation in the research may be able to deduce who particular participants are.

The research is being carried out under the auspices of the Open University and will comply with the Open University Human Research Ethics Committee requirements. The methodology and ethical considerations have been approved by the Human Research Ethics Committees at The Open University [HREC/2698.Aubrey-Smith]. The research complies with the British Educational Research Association's guidelines for ethical research which are available from

https://www.bera.ac.uk/researchers-resources/publications/ethical-guidelines-for-educational-research-2011

Participants are encouraged to discuss any concerns with the researcher. Schools who take part in this research and the teachers that are interviewed and observed are free to withdraw from the research at any time without explanation or prejudice by making this known in writing to fionaaubreysmith@googlemail.com before [date]. After that date, data will have been processed (transcribed or started to be analysed). You are able to receive a copy of the research findings by indicating this on the consent form below.

This research is being supervised by Professor Peter Twining, Professor of Education (Futures) at The Open University. If you have any concerns or complaints about this research or the researcher, he can be contacted at peter.twining@open.ac.uk

There is no budget available to cover any costs involved with participation such as supply cover, and neither are there any rewards either financially or in kind to any person or organisation participating in this research.

Data will only be collected and analysed for participants who have given informed consent. Children for whom informed consent has been obtained will be clearly identified by being seated in a specific area of the classroom and/or by wearing a sticker to ensure that the researcher only focuses on them.

Having read this document, if you, as authorised representative of the school are happy to consent to your school participating in the research, please complete and sign 'School Consent Form', and return by email to Fiona Aubrey-Smith. Once you have completed this, the next step will be to identify which teachers at your school would like to take part in the research by becoming one of the cases. Please could you provide potential participants with the document 'Teacher Information' so that they are able to read exactly what is involved prior to their deciding whether to take part. Please would you ensure that they are aware that their taking part in the research is optional, and that they are under no obligation or expectation to do so. If they are happy to take part, the teacher should confirm this by email to Fiona Aubrey-Smith, and then return the signed 'Teacher Consent Form' to Fiona on the day of the first interview. There are also information and consent sheets for the children being observed.

If you have any questions or comments, please contact Fiona Aubrey-Smith, [Retracted phone number] or fionaaubreysmith@googlemail.com

School Informed Consent Form

I consent to my school participating in Fiona Aubrey-Smith's EdD research and agree that the researcher may use the data collected as described in the information for schools which accompanied this consent form.

By consenting to participate, I acknowledge that:

- I have the authority to provide consent for my school to participate in this research;
- I have been provided with a written statement in plain language, to keep, that explains what taking part in the project will involve (School Information);
- I understand that I am free to withdraw my school from the research at any time without explanation or prejudice and to withdraw any related unprocessed data by contacting Fiona Aubrey-Smith (fionaaubreysmith@googlemail.com) before [date];
- I understand that the data collected is for EdD research, and findings may be published as an EdD thesis as well as in further reports and publications in print and online;
- I understand that the confidentiality of the information collected will be safeguarded, subject to any legal requirements;
- I understand that all data about the school and people within it will be anonymised in any publications arising from the research, including the EdD thesis itself, but that due to the small number of participants it may be possible people who know the school well to identify individual participants;
- I understand that the data generated will be stored securely and will be destroyed after five years;
- I understand that teachers within my school who give their informed consent will be interviewed and observed teaching as part of this research, and that the data generated will be confidential to them and not made available to their managers or employers. I understand that data about them will be anonymised and referred to through the use of pseudonyms;
- I understand that the interviews and observations will be video and audio recorded. Data will only be used for those participants who have given their informed consent (in the case of children this includes informed consent being given by their parents). I also understand that films will not be published or shared or viewed with anyone except the researcher, her supervisors and examiners;
- I understand that all data about the school and people within it will be anonymised in any publications arising from the research, including the EdD thesis itself. I also understand that if any photograph which includes my school is used in publications that they will be pixelated/blurred in such a way that the school and individuals within it are not recognisable. However, I also understand that due to the small number of participants involved in this research, it may be possible for people who know that my school has been involved to identify it, and those involved through the process of deduction;
- I have been informed that a summary copy of the research findings will be forwarded to me, should I request this.

I give my consent for my school to participate in this research: Yes / No
I give my consent for interviews and observations to be filmed and photographed: Yes / No
I wish to receive a copy of the research findings: Yes / No
[please circle Yes or No for each of the above]

Name of School:
Name and role of person with authority to provide consent:
Signature:
Date:

Appendix C: Informed Consent Information Sheets and Forms – Teacher

Teacher Information

Research title: To what extent is digital technology affecting teachers implicit and espoused pedagogical values and beliefs?

For each teacher involved in the research, there will be;

1) an interview for approximately 45 minutes discussing your views of teaching and learning;
2) 3-5 lesson or activity observations (your normal class/timetable/planning), and for each of these there will be a pre-observation interview of approximately 20 minutes talking about what you have planned to do, and a post-observational interview of approximately 20 minutes for each of those observations, talking about the lesson/activity. These will take place as close to before and after the observed lesson as possible but determined by what works best around your existing commitments.

All of the above will be undertaken by Fiona Aubrey-Smith as researcher with the purpose of understanding what your views on teaching and learning are and what is influencing those views. There is no 'right' response to any of the research.

To aid with data analysis, the interviews and observations will be filmed. In addition, photographs may be taken of the classroom (e.g. layout of the desks, grouping of the children, displays) and of children's work. The images and films will only be viewed by the researcher and her supervisors as part of data analysis and supervision discussions. They will not be shared with any other 3rd parties including your managers and employers. Films will be kept securely with a secure password, and not accessible to anyone except the researcher and her supervisors, and they will be destroyed five years after the research has been completed. The filming will capture the activities of the teacher and children during the observed lesson, and any conversations between the researcher and teacher/child.

The findings of the research will be published as an EdD thesis and there may also be further reports or papers published in print and online. All participating Children, Teachers and Schools will be anonymised in any reports, images or recordings that are published as part of this research and where referred to will be given pseudonyms. Any still images used to illustrate points in published materials will ensure that each person's image within it is pixelated/blurred so that it is not possible to recognize any individual person. Video will not be published. However, due to the small number of participants (5) it may be possible for those involved to be recognised by people who are familiar with their school through a process of deduction.

Parental consent will be sought where children are present during observations. Data will only be collected and analysed for participants who have given informed consent. Children for whom informed consent has been obtained will be clearly identified by being seated in a specific area of the classroom and/or by wearing a sticker to ensure that the researcher only focuses on them.

The research is being under the auspices of the Open University and will comply with the Open University Human Research Ethics Committee requirements. The methodology and ethical considerations have been approved by the Human Research Ethics Committees at The Open University [HREC/2698.Aubrey-Smith]. The research complies with the British Educational Research Association's guidelines for ethical research which are available from
https://www.bera.ac.uk/researchers-resources/publications/ethical-guidelines-for-educational-research-2011

Participants are encouraged to discuss any concerns with the researcher, but both schools who take part in this research, and the teachers that are interviewed and observed are free to withdraw from the research at any time without explanation or prejudice by making this known in writing to fionaaubreysmith@googlemail.com [date]. After that date, data will have been processed (transcribed or otherwise started to be analysed). You are able to receive a copy of the research findings by indicating this on the consent form below.

This research is being supervised by Professor Peter Twining, Professor of Education (Futures) at The Open University. If you have any concerns or complaints about this research or the researcher, he can be contacted at peter.twining@open.ac.uk

Having read this document, if you are happy to consent to participating in the research, please confirm this by email and then complete and sign 'Teacher Consent Form', for collection by Fiona Aubrey-Smith on the day of the first interview.

If you have any questions or comments, please contact Fiona Aubrey-Smith, [Retracted phone number] or fionaaubreysmith@googlemail.com

Teacher Informed Consent Form

I consent to participating in Fiona Aubrey-Smith's EdD research and agree that the researcher may use the data collected as described in the information for teachers which accompanied this consent form.

By consenting to participate, I acknowledge that:

- I have been provided with a written statement in plain language, to keep, that explains what taking part in the project will involve (*Teacher Information*);
- I understand that I am free to withdraw myself from the research at any time without explanation or prejudice and to withdraw any related unprocessed data by contacting Fiona Aubrey-Smith (fionaaubreysmith@googlemail.com) before [date];
- I understand that the data collected is for EdD research, and findings may be published as an EdD thesis as well as in further reports and publications in print and online;
- I understand that the confidentiality of the information collected will be safeguarded, subject to any legal requirements;
- I understand that as part of the research I will be filmed during interviews and observations and that photographs may also be taken. I also understand that films will not be published or shared or viewed with anyone except the researcher and her supervisors and that photographs will only be used where individuals and the school are not recognisable;
- I understand that the interviews and observations will be video and audio recorded. Data will only be used for those participants who have given their informed consent (in the case of children this includes informed consent being given by their parents);
- I understand that all data about the school and people within it will be anonymised in any publications arising from the research, including the EdD thesis itself. I also understand that if any photograph which includes me is used in publications that they will be pixelated/blurred in such a way that I am not recognisable. However, I also understand that due to the small number of participants involved in this research, it may be possible for people who know that I have been involved to identify me through the process of deduction;
- I understand that the data generated will be stored securely and will be destroyed after five years;
- I have been informed that a summary copy of the research findings will be forwarded to me, should I request this.

I give my consent to participating in this research: Yes / No
I give my consent for interviews being video and audio recorded: Yes / No
I give my consent for observations to be video and audio recorded: Yes / No
I give my consent for photographs to be taken during the observations: Yes / No
I wish to receive a copy of the research findings: Yes / No
[please circle Yes or No for each of the above]

Name of Teacher:
Signature of Teacher:
Name of School:
Date:

Appendix D: Informed Consent Information Sheets and Forms: Child / Parent

Parent & Child Information

Dear Parent / Carer

You are receiving this information because your child's teacher has kindly agreed to take part in research which aims to contribute towards a greater understanding of the teaching profession.

The title of the research is **"**To what extent is digital technology affecting teachers implicit and espoused pedagogical values and beliefs?". In other words, how does digital technology affect teacher's views about teaching and learning. The focus of the research is on the teacher, but in order to understand their teaching it is necessary to observe their classroom practice. The researcher, Fiona Aubrey-Smith, will be observing the teacher doing their normal day-job teaching your child's class during both subject and non-subject time (e.g. assembly, playtime). These observations will be filmed so that the researcher can watch the observations many times after they have taken place as part of the research analysis. Photographs may also be taken, for example of the children's work. The films will only be viewed by the researcher and her supervisors who will support her with that analysis. Films will be kept securely with a secure password, and not accessible to anyone except the researcher, and they will be destroyed five years after the research has been completed.

When the research findings are published all children, teachers and schools will be anonymised. All participating schools', teachers' and children's names will be changed, and any still images used to illustrate points in published materials will ensure that each person's image within it is pixelated/blurred so that it is not possible to recognize any individual person. Video will not be published.

During the observations, the researcher would like to talk to children to understand their experiences of the teaching that they receive. This will take place in the classroom during the lesson and will be short conversations about the learning activity that they have been given by their teacher, and the filming will capture the conversation between the researcher and child as the child carries out their normal learning activities. The researcher is a former primary school teacher, has a current DBS check and will not be alone with any child at any time.

The research has been considered by the Human Research Ethics Committees at The Open University and complies with the British Educational Research Associations Guidelines for Ethical Research. This research is being supervised by Professor Peter Twining, Professor of Education (Futures) at The Open University. If you have any concerns or complaints about this research or the researcher, he can be contacted at peter.twining@open.ac.uk

Having read this document, if you are happy to consent to your child participating in the research, please complete and sign 'Parent Consent Form', and return to your child's teacher. You are free to withdraw your consent at any time without explanation or prejudice, in writing, before [date] after which the analysis of the data will have begun and it will not be possible to extract individual's data. You are able to receive a copy of the research findings by indicating this on the consent form below.

Data will only be collected and analysed for children whose parents have given informed consent. Children for whom informed consent has been obtained will be clearly identified by being seated in a specific area of the classroom and/or by wearing a sticker to ensure that the researcher only focuses on them.

If you have any questions or comments, please contact Fiona Aubrey-Smith, [Retracted phone number] or fionaaubreysmith@googlemail.com

Explanation for children

Please read this to your child and ensure that they understand this and are happy to take part, before you both sign the consent form.

Your teacher is taking part in a project to help understand what teachers think about their teaching.

As part of this project, Mrs Aubrey-Smith will be coming into your classroom and watching your teacher teach your class. She might ask you some questions during the lesson, to help her understand what is going on. She will be filming some of the lesson so that she can watch it back afterwards to make sure she understands what has happened and she might take photographs of you and your work.

Are you happy to talk to Mrs Aubrey-Smith, in your classroom during your lessons, and for her to record what you say and do during the lesson?

Parent and Child Consent Form

I consent to participating in Fiona Aubrey-Smith's EdD research and agree that the researcher may use the data collected as described in the information for parents and children which accompanied this consent form.

By consenting to participate, I acknowledge that:

- I have been provided with a written statement in plain language, to keep, that explains what taking part in the project will involve (*Parent Information*);
- I understand that I am free to withdraw my child from the research at any time without explanation or prejudice and to withdraw any related unprocessed data by contacting Fiona Aubrey-Smith (fionaaubreysmith@googlemail.com) before [date];
- I understand that the data collected is for EdD research, and findings may be published as an EdD thesis as well as in further reports and publications in print and online;
- I understand that the confidentiality of the information collected will be safeguarded, subject to any legal requirements;
- I understand that as part of the research my child will be present during observations of teachers, and that these observations will be filmed, and photographs may also be taken. I understand that my child may feature in these. I also understand that films will not be published or shared or viewed with anyone except the researcher and her supervisors;
- I understand that all data about the school and people within it will be anonymised in any publications arising from the research, including the EdD thesis itself. I also understand that if any photograph is used in such publications which includes my child, that they will be pixelated/blurred in such a way that they are not recognisable;
- I understand that the data generated will be stored securely and will be destroyed five years after the EdD has been completed;
- I have been informed that a summary copy of the research findings will be forwarded to me, should I request this.

I am happy to talk to Mrs Aubrey-Smith and be filmed learning with my class: Yes/No
Name of Child:
Signature of Child:

I give consent for my child to participate in this research: Yes / No
I give consent for my child to be filmed talking about their learning: Yes / No
I wish to receive a copy of the research findings: Yes / No
[please circle Yes or No for each of the above]

Name of Parent:
Signature of Parent:

Name of School:
Date:

Please complete this form and return it to [TEACHER NAME] by [INSERT DATE]

Appendix E: Interview Guide - Headteacher

Italic text indicates amendments since the OU HREC granted the original favourable opinion and were re-submitted to HREC and accepted onto their record. The organisation aspects are rephrasing, and the Question aspects are additional questions.

Objective: To learn about the school arena. (Supporting RQ1, RQ2, and RQ3)

Participants

- 1 headteacher
- 1 researcher

Organisation

- *The school and headteacher information and consent forms will have been shared with the headteacher, who will confirm that they have understood them by signing the informed consent form;*
- The interview should take place after the school context data has been gathered, but before any other data collection;
- *The location of the interview will be determined by the headteacher; usually taking place in headteacher's office in school during the working school day;*
- The interview will be filmed on an iPad which will be located in a position which captures both the headteacher and researcher;
- The interview will also be audio recorded, as a backup incase there are problems with the filming.

Before the interview commences, the researcher will;

a) Confirm that the headteacher has read the information sheet, Provide an opportunity for the headteacher to ask any questions and Ensure that the headteacher is happy with their role in the research before they sign the Informed Consent Form;
b) Thank them for taking part in the research;
c) Confirm that the headteacher is happy for the interview to be filmed and audio recorded;
d) Explain that if the headteacher is uncomfortable at any stage they may request that the interview ceases and they may withdraw from the research;

At the end of the interview, the researcher will;

e) Offer the headteacher an opportunity to ask any questions;
f) Thank them for taking part.

Headteacher Interview Questions

The following are stimulus questions; additional sub-questions will be used to surface more detail in responses as and when necessary:

1) How would you describe the school's vision and ethos?
2) What does this look like in practice for Teachers? Children? Leaders?
3) What have been the influences to this vision and ethos? How are staff involved in turning that into practice?

4) If a new colleague came to the school what impression would they get of the school?
5) How important do you think those impressions are?
6) What do you consider to be the school's greatest strengths? What are the current improvement priorities?

7) How would you describe the relationships between staff and children across the school? How does this vary across classes, cohorts, year groups, classrooms/playgrounds/other places?

8) How is the school organised for teaching and learning – thinking about things like groups, resources, time, routines? Why is it this way? How consistent is it over subjects, places and times? How effective are these choices?

9) What support do the different children in the school need? Why do they need these kinds of support? What do influences the range of needs, and how they are responded to?

10) Can you describe what your perfect lesson would look like in this school? Why would those features make it a perfect lesson? What would the teacher be doing? What would the children be doing? What would the room feel like? How would an observer describe it?

11) What would the most awful lesson that you could imagine in this school look like? Why would those features make it so terrible?

12) How would you describe Teacher X [the teacher that this case centres upon]?

- *a. How do you think their practice aligns or differs from your vision for the school?*
- *b. What is their relationship with ICT?*
- *c. Are they similar or significantly different from the other teachers in your school?*

13) Is there anything else you would like to tell me that you think is important?

Appendix F: Interview Guide - Teacher Interview 1

Italic text indicates amendments since the OU HREC granted the original favourable opinion and were re-submitted to HREC and accepted onto their record. The organisation aspects are rephrasing, and the Question aspects are additional questions.

Objective: To learn about the teacher's espoused pedagogical values and beliefs (RQ1) and the extent to which these are being shaped by ICT.

Participants

- 1 teacher
- 1 researcher

Organisation

- The interview should be filmed – one iPad will be located in a position which captures the two participants side-on.
- The interview will also be audio recorded, as a backup incase there are problems with the filming.
- The interview should take place after the school context data has been gathered, but before any other data collection involving the teacher.
- Ensure the necessary information and consent forms have been understood and completed.

Areas to cover

a) Confirm that they are still happy to take part in the research and that informed consent has been obtained;
b) Thank them for taking part in the research;
c) Ask if it is possible to audio record and film the interview;
d) Give the teacher an opportunity to ask about the research to ensure that they understand their role in it;
e) Explain that if they are uncomfortable at any stage the interview may be stopped and they may withdraw from the research;
f) Ensure background details completed;
g) At the end of the interview give the teacher an opportunity to ask any questions and thank them for taking part.

Teacher Interview 1 Questions

The following are stimulus questions; additional sub-questions will be used to surface more detail in responses as and when necessary:

14) How would you describe the school's vision?
15) What does this look like in practice for Teachers? Children? Leaders?
16) What do you think influences that vision?

17) If a new colleague came to the school what impression would they get of the school?
18) How important do you think those impressions are as a teacher?
19) As a teacher working at this school what do you consider to be its greatest strengths? What are the missed opportunities? What do you see as your role in these? What other influences are there to these strengths and opportunities?

20) Why did you want to become a teacher? What influenced that?
    a. *What role do you think your childhood experiences of teachers; good and bad, had on your becoming a teacher? How do those teachers/influences affect what you do these days now that you are a more established teacher?*

21) Where do you see your future in education? What influences that view? What will influence the likelihood of that future taking place in the way that you describe?

22) How would you describe your relationship with the children in your class? How does this change with each cohort that you teach? What does that look like in practice? What influences any changes?
23) How does this compare to the children in other classes that you do not teach? What does that look like in practice?

24) How do you organise your class – thinking about things like groups, resources, time, routines? Why do you do it this way? How consistent is it over subjects, places and times? How effective do you find these choices? How could you improve this?

25) What support do the different children in your class need from you? Why do they need these kinds of support? What do you think influences the range of needs, and how you respond to them?

26) What do you think are your strengths as a teacher? What would your children say about that? Why do you think these are your strengths?

27) To what extent are you the teacher that you want to be?
28) What barriers do you face as a teacher? What would you differently if they were removed?
29) What influences these views?

30) What do your children like most about the way that you teach them? Why do you think that is?

31) Which other teachers do you aspire to learn from? What is it about them that you would like to learn from? What might others want to learn from you?

32) Can you describe what your perfect lesson would look like? Why would those features make it a perfect lesson? What would you be doing? What would the children be doing? What would the room feel like? How would an observer describe it?

33) If you were observing another teacher, what would the most awful lesson that you could imagine look like? Why would those features make it so terrible?

34) In what ways do you currently work with teaching colleagues? How does this affect your thinking and your practice?

35) ICT

a. *What ICT do you use: at home, at school, out and about?*

Take each of the ICT mentioned in turn and ask the following questions:

b. *How would you describe how you use them?*
c. *Why do you think you use these? (who or what might have influenced these choices?)*
d. *What do you think the implications are of how you use these?*
e. *What differences do you think that ICT such as these, or others, make to the people around you – at home, at school, out and about, nationally, culturally?*
f. *Why do you think this is?*

36) Is there anything else you would like to tell me that you think is important?

Appendix G: Interview Guide - Teacher Interview 2

Italic text indicates amendments since the OU HREC granted the original favourable opinion and were re-submitted to HREC and accepted onto their record. The organisation aspects are rephrasing, and the Question aspects are additional questions.

Objective: To learn about the teacher's intended practice for a lesson that will then be observed (RQ2), and any influence that ICT have had on this (RQ3).

Participants
- 1 teacher
- 1 researcher

Organisation
- The interview should be filmed – one iPad will be located in a position which captures the two participants side-on.
- The interview will also be audio recorded, as a backup incase there are problems with the filming.
- The interview should take place after Teacher Interview 1, but before the Lesson Observation, and at a time and place convenient to the teacher.
- After Interview 2 the observation will take place. This cycle (Interview 2, Observation, Interview 3) will be repeated for each of the 3-5 observations undertaken.

Areas to cover
a) Thank them for taking part in the research;
b) Ask if it is possible to audio record and film the interview;
c) Ensure that consent forms have been completed for those being observed, and discuss arrangements for those without consent;
d) Explain that if they are uncomfortable at any stage the observation may be stopped and they may withdraw from the research;
e) At the end of the interview give the teacher an opportunity to ask any questions, and thank them for taking part.
f) Obtain a copy of the lesson plan and/or resources the teacher intends to use.

Interview 2 Questions
The following are stimulus questions; additional sub-questions will be used to surface more detail in responses as and when necessary:

1) What are your intentions for this lesson?
2) How have you planned for these to happen?
3) What documentation supports this – e.g. plans, assessment records, class data.
4) Why do you want these things to happen?
5) Who is involved in this lesson and why? What is their role?

6) Who or what determines what you will be teaching? (leaders, policy, children's demographics and needs?)
7) How much influence do you have over what this lesson is about, and how it will take place?
8) How does that affect what you do and how you do it?
9) If those influences were removed what would you do differently?

10) How does this lesson relate to prior learning?
11) How does this lesson relate to the children's lives beyond school?

12) How will the children be organized – locations, groups, timing, activities? Why is this?

13) Are there specific children who will need additional support? Who are they, Why do they need this support and how will it be provided?
14) What equipment and resources will be used and why?

15) Is there anything else you would like to tell me that you think is important?

Appendix H: Interview Guide - Teacher Interview 3

Objective: To learn about the teacher's views on the lesson that has been observed, how their enacted practice compares to their intended practice (RQ2), and any influence that ICT had on this (RQ3).

Participants

- 1 teacher
- 1 researcher

Organisation

- The interview should be filmed – one iPad will be located in a position which captures the two participants side-on.
- The interview will also be audio recorded, as a backup incase there are problems with the filming.
- The interview should take place after the Observation. This cycle (Interview 2, Observation, Interview 3) will be repeated for each of the 3-5 observations undertaken.

Areas to cover

g) Thank them for taking part in the research;
h) Explain that if they are uncomfortable at any stage the interview may be stopped and they may withdraw from the research;
i) Ask if it is possible to audio record and film the interview;
j) At the end of the interview give the teacher an opportunity to ask any questions, and thank them for taking part.

Interview 3 Questions

The following are stimulus questions; additional sub-questions will be used to surface more detail in responses as and when necessary:

Reflections on the observed lesson

1) Thank you for letting me sit in on that lesson. I really enjoyed it when…
2) How do you feel that lesson went?
3) How did that lesson compare to your intentions?
4) Why do you think these things (points raised in responses to questions above) happened?
5) How do you think that you responded to these things?
6) How did different children across the class respond to the lesson? Why do you think that was?
7) Which children did better, or did not do as well, as you expected? Why do you think that was?
8) What do you think about the outcomes of the lesson? How does that compare to your expectations? What are the implications of this?
9) What will happen next?
10) What surprised you about this lesson?
11) What do you think the children would say about this lesson?
12) What would you do differently if you were to do that lesson again?
13) Is there anything else you would like to tell me that you think is important?

Appendix I: Observation Guide

Objective: To learn about the teacher's enacted practices (RQ2), and any influence that ICT had on these (RQ3).

Participants
1 teacher, supporting adults/teaching staff as determined by the lesson being observed children in the corresponding class/activity, researcher

Organisation

- The observation should be filmed – one iPad will be located in a position which captures both teacher and children for the input of the lesson/where the class are grouped together and moved to a pivoting position where the lesson changes to smaller group or individual working.
- The observation should take place after Interview 1 and Interview 2 have taken place with the teacher. This cycle (Interview 2, Observation, Interview 3) will be repeated for each of the 3-5 observations undertaken.
- Ensure the necessary information and consent forms have been understood and completed by the teacher and parents/children, and that any limitations regarding capturing children on film, audio or visual are mutually understood.
- Agree how researcher will be introduced to the children and where researcher will be located.
- Researcher will be located somewhere discrete and will move around the classroom discretely and ask questions of specific children as and when necessary to respond to the questions below.
- At the end of the observation give the teacher an opportunity to ask any questions and thank them for taking part.

Aims
There should be 3-5 different situations observed, including an English/Maths lesson, a lesson from the broader curriculum, and some non-subject teaching time (e.g. assembly, playtime, transition activities).

Observation

1) What is the teacher's enacted practice?
2) The following are prompts to help capture key features of the practice;
3) How does the lesson begin? Who is engaged/not engaged and how is this apparent?
4) How is the lesson introduced? How are expectations set? (How is the researcher / observation explained?)
5) What kind of pace and tone is the lesson being conducted with?
6) What is the mood of the room? What are the influencing factors?
7) How is the teacher interacting with the children?
8) What variances are there in how the teacher interacts with different individuals and groups?
9) How are the children responding to this?
10) How are the children interacting with each other? And with other adults?
11) What kinds of references are made to prior / future learning or experiences?
12) Are any routines and habitual behaviours appearing?
13) What kind of expectations are there within the lesson – in action – of behaviour, interactions, achievement?
14) What resources are being used, by whom and what for?
15) What do the children seem most engaged with and what appears to be influencing that?
16) To what extent are documents, assessments, planning, class data etc used or referred to during the lesson?

Appendix J: Teacher 1 follow up interview questions

The following additional questions were woven into the discourse with Teacher 1 on follow-up visits, alongside any questions from the planned Interview Guides which had not already been addressed. This ensured coverage of the Interview Guides as well as probing specific areas highlighted by early analysis of interview transcripts from previous visits.

1) How would you describe yourself when you are teaching / how would you describe yourself when you are not teaching?
2) What memories do you have of your own childhood experiences in school?
3) Which teachers do you remember in particular and why do you think that is?
4) Do you think any of those memories or experiences affected your decision to become a teacher or how you teach today?
5) In what ways are your uses of technologies similar or different to those of your colleagues in this school?
6) How would you describe your role in this school?

Appendix K: Teacher 2 follow up interview questions

The following additional questions were woven into the discourse with Teacher 2 on follow-up visits, alongside any questions from the planned Interview Guides which had not already been addressed. This ensured coverage of the Interview Guides as well as probing specific areas highlighted by early analysis of interview transcripts from previous visits.

1) What do you think are your strengths as a teacher? What would your children say about that? Why do you think these are your strengths?
2) To what extent are you the teacher that you want to be?
3) What barriers do you face as a teacher? What would you differently if they were removed? What influences these views?
4) What do your children like most about the way that you teach them? Why do you think that is?
5) Which other teachers do you aspire to learn from? What is it about them that you would like to learn from? What might others want to learn from you?

Appendix L: Teacher 3 follow up interview questions

The following additional questions were woven into the discourse with Teacher 3 on follow-up visits, alongside any questions from the planned Interview Guides which had not already been addressed. This ensured coverage of the Interview Guides as well as probing specific areas highlighted by early analysis of interview transcripts from previous visits.

1) What do you see as the purpose of education? [Attention to Constitutive Order / and direct influence of C.O on Roots & Growth / surface IPF trends]
    a. What is the role of the school (and the teacher) in children's lives?
    b. Who is responsible for a child's learning? Why them?
    c. Where does a teachers' role start and stop?
    d. How does that role relate to a child's life?
    e. Who shapes a school? What influences how a school is, and how does this influence the teachers working there?
2) How would you describe your style of teaching? [to surface IPF trends]
3) Can you tell me about your teacher training experiences and how they prepared you for teaching? [Growth]
4) To what extent are you the teacher that you want to be? What are the barriers causing these gaps and what would remove those barriers? [Identity]
5) Can you tell me about your experiences growing up and how that did or did not influence your becoming a teacher? [Roots, Growth]
    a. What other role models or influences did you have away from teaching?
    b. What were your parent's views on teachers and teaching?
6) What are the core / key skills that you think teachers should have? Why? [Setting / Identity]
7) How do you think the changes going on nationally in education affect your own views on teaching and learning, and on your day to day practices? [Constitutive Order]
8) Can you talk me through how you reflect on a lesson / interaction? What processes do you go through? [Identity / Setting / Growth]
    a. How do you think this compares with your peers?
    b. What difference do you think that it makes to your practice?
    c. What difference does it make to what you choose to do/use and not do/use?
9) Can you share with me some of the paperwork associated with lessons? [Variance between intended/espoused and spoken/written, and locus of control within shared plans/collaborative team]

10) Is there another teacher who you feel is similar to you in terms of values, pedagogy etc? How does their perception/use of digital technologies compare? [‘The Me-ness of Me’ / Identity]
11) Can you think of another tool that is not digital technology related, and talk me through how you have/have not adopted it? [clarifying findings about reluctance - Mindset about tech or general Mindset?]
12) How much do you think the age group that you work with influences how you use technology? [Attention to Arena / Ref Growth and previous schools/findings]
13) We spoke last time about some of the negative uses of technologies. Can you share with me some examples of where you’ve seen it used positively within teaching and learning? What was used and what difference did it make? [Frame of reference for technology]
14) What do you think makes digital technology worth using? What is not worth using and why? What difference does it make in our personal lives? What is the potential of technology in education? What are the opportunities and challenges?
15) How much do you think the sequence of schools and the challenges of each have affected the lens through which you view teaching? What has it shaped? What impact has that had? [Growth]
    a. What was the main reason for moving to each role that you have held?
16) What do you think the role of professional development is in teaching and learning? What about the role of research? [Identity]

Appendix M: Summary description of School A (Arena data)

School A was one of four schools that were part of an overarching charitable trust, known as a multi academy trust (MAT). The person that this research describes as the headteacher held the post of executive principal of the Trust. Teacher 1 also held the post of director of teaching and learning across the Trust, and Teacher 2 also held the post of assistant principal of the school.

The school followed policy as determined by the British government, had been judged as consistently Good by Ofsted, and had above average outcomes in relation to national expectations. At the time of data generation there were 35.3% of children receiving free school meals (compared to 24.2% nationally), 1.6% of children for whom English was an additional language (compared to 21.3% nationally), and 12.5% of children receiving support for Special Educational Needs or Disabilities (SEND) (compared to 12.2% nationally). The school estate had three playgrounds and a field and was located with farming fields to one side and a large housing estate to the other. The school day started at 8:30am, with lessons from 8:35am, and finished at 3:10am for Key Stage 1 (KS1) and 3:25pm for Key Stage 2 (KS2). Morning and after school clubs provided wraparound provision from 8am until 4:15pm. There was a morning breaktime from 10:15-10:30am, and an afternoon break from 2-2:15pm, with a lunch break from 12noon to 12:45pm.

Walking into the school, there was a welcoming environment. Displays illustrated the school values in practice. The school building itself was a 1970s style building which had been well maintained and had tidy communal spaces with light coloured décor and efficiently organised furnishings. The school had a traditional style classroom for each of the classes in the school as well as a number of additional rooms and spaces such as a glass walled radio station and two staffrooms; one of which was used specifically for teachers to undertake planning, preparation, assessment and research. In staff and administrative areas there were frequent reminders about the role and purpose of staff being in the school and the contributions that they made to school improvement. For example, on the back of the toilet door was an extract from the school improvement plan made into a poster labelled ‘How will you contribute to this today?’.

Appendix N: Summary of School B (Arena data)

The school was owned by a standalone charitable trust, with fees being towards the upper end of the spectrum charged by independent schools, and with a small number of children boarding at the school. The 'good' school was an independent charity, with most children joining the school above the national average attainment levels, and 13% of children requiring some kind of additional SEND support, although none had statements or EHCPs, and less than 1% spoke English as an additional language. The school was not part of a chain or group of schools but heavily focused on preparing children for fee paying secondary schools and thus the Common Entrance Exam required to gain places at such schools (T3-1, 11.24). The headteacher of the school had been in post for nine years as well as being a part-time independent schools inspector. The school followed statutory requirements as determined by the British government, had been judged as consistently Excellent by the Independent Schools Inspectorate (2017), and had high attainment outcomes including 29% of children winning scholarships to their chosen next school (2017).

The school office, which was located within the original 19th century buildings, was formal and furnished in a period style. Displays demonstrated the school's pride and aspirations for children; combining displays of secondary schools that they may go on to and sporting trophies that had been won. The school estate combined buildings from the 19th century with more modern and purpose-built buildings and were furnished in line with each buildings' age and purpose. The school estate had multiple outside spaces for both curriculum and recreational purposes including playgrounds, and fields, and is located with farming fields to one side, and a main road with neighbouring large private housing the other side. The area surrounding the school was well above average socio-economically and sits on the outskirts of a small city within the south east of England. The school day started at 8:10am, first with registration and chapel, followed by lessons from 8:45am, finishing at 4pm (5:15pm for Years 4 and 5, and 6pm for Year 6 to 8). For non-boarding children there was then a 30-minute break before a further lesson and structured Prep (homework) time, ending at 6pm. For boarders there was then a 30-minute supper break followed by further prep or activities before bedtime. Wednesday afternoons were dedicated to sport and hobbies, and pastoral, club and non-academic time was woven throughout the timetable every day. Children in years 4 to 8 also attended school 8:10am to 12:15 on Saturdays with additional sports matches on Saturday afternoons.

Children moved between classrooms and locations for different lessons once they had reached KS2 (which was the location of the teacher and lessons observed), with their form room/tutor being a base point for registration and prep time. Children were expected to navigate the school campus and line up outside each classroom in time for each lesson.

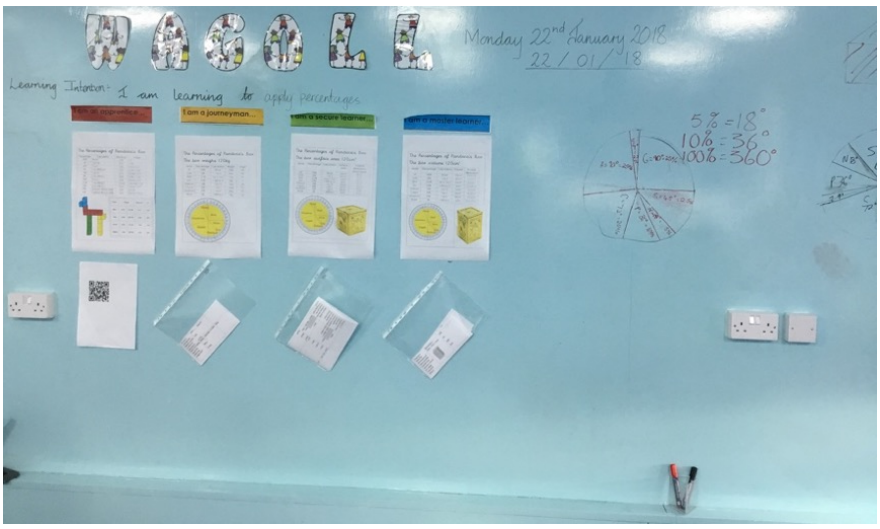
School B had a reliable infrastructure in place (HT3, 26.53). The school had also invested in providing enough laptops for every child in each class alongside a teacher desktop and interactive whiteboard in every classroom (HT3, 23.34). Four IT support staff were available to support this infrastructure and teaching peers taught children ICT safety lessons (T3-4, 7.48, 8.29). Children were thought by both headteacher and teacher to be very competent with using Google Chromebooks (HT3, 28.35, T3-4, 8.55, T3-6, 7.08). Neither headteacher nor teacher spoke about any innovative uses of ICT, although both mentioned the use of management information software (HT3, 24.36), Microsoft PowerPoint use in presentations and assemblies (T3-4, 6.52).

Appendix O: Observation Vignettes for Case 1

Observation 1

Observation 1 (T1, Obs.1) was an hour-long maths lesson with middle and higher attaining children drawn from across multiple year 6 classes. The classroom had rectangular tables laid out in a horse-shoe shape and the teacher using the IWB at the open end of the horseshoe. The format of the lesson provided children with an input led by the teacher with attention drawn to the IWB and the teacher moving around the room throughout the input using a portable mouse and keyboard to control the IWB images. The children quickly and quietly entered the room and found their assigned seat with the teacher greeting each child by name at the door. Seats had been assigned based on previous lesson assessment such that children who were thought to have similar levels of understanding of the current topic were paired together, with each pair consisting of a boy and a girl. At each desk space was equipment needed for the lesson ahead along with strips of paper indicating the lesson's learning intentions, with the child's name at the top ready to be glued into their maths books. Children were calm and well behaved, and this appeared to be the norm. Throughout the observation there were no behavioural issues or interventions, dialogue between teacher and children was entirely focused upon the learning intentions, and dialogue between children was nearly entirely focused on learning intentions. The teaching input was given by the teacher using the interactive whiteboard to show imagery, text and instruction. Children sat at their assigned desk positions and were attentive to this input. The input linked the mathematics learning about percentages to current history learning about ancient Greeks, and to other areas of mathematics such as angles, surface area, volume, pie charts and use of tables and protractors. Once the input was complete, the teacher set a group of four children off on an independent task (which was filmed by an iPad using Iris Connect), and then returned to explain to the rest of the class their task. The management of learning activity and progression was through children undertaking their first task and then once completed checking their answers on a poster on the wall and collecting a piece of paper which explained their second task. There were nine tasks overall, at four increasingly challenging levels (Apprentice, Journeyman, Secure and Master Learners), with each level having a practice activity (on white paper) followed by an Application activity (on yellow paper) – seen in the photograph below.

Figure AP1: Photograph of tasks set out on the classroom working wall



Children stuck their papers into their books as they progressed through them. Children across the class completed the activities at varying paces, and all were clearly used to moving on to the next part of the learning using this format. Children had the opportunity to use the 'working walls' (write-on wall surfaces) so that they could practice their recorded work before committing it to their book. At the end of the lesson the teacher asked the children what they had learnt during the lesson and linked the learning to the next lesson.

There were a number of ways that ICT were used through the teaching and learning that took place. The material shown upon the interactive whiteboard had been prepared on the teacher's laptop and was projected and viewed on the large screen. During the lesson the children who needed to have the first activity explained to them again after the initial input could choose to pick up and view a 3 minute film prepared by the teacher, either accessing it on a tablet which was available for children to pass amongst themselves, or by taking a laptop to the Learning Wall and using the QR code to access the video if the tablet was already in use elsewhere. Both methods were seen being used; the tablet used by 6 children and the laptop by 2 children. There was also a tablet used by the group of four who had been tasked separately at the outset of the lesson, whereby they watched an explanation relating to the input, and then used this to launch them into their activities. This group, who the teacher had said would not be the main focus of the lesson as they were being extended in their learning, were filmed throughout the lesson by an additional tablet device on a tripod, using Iris, such that the teacher could watch back their interactions after the lesson and use her findings to inform the following days' work.

Observation 2

Observation 2 (T1, Obs. 2) was of a group of four year 6 children who had been identified as needing intervention for their reading fluency and came to the intervention classroom for this provision for approximately 20 minutes. They were greeted at the door by the

teacher and were instructed to collect a laptop and headphones from the laptop cabinet located by the classroom entrance, and then to sit as two boy/girl pairs. The children were in this intervention group because of a slightly lower vocabulary range and slightly lower reading fluency speed but none had special educational needs or specific learning difficulties. The teacher introduced the short task using the IWB which was to access the teacher's YouTube channel and play a screencast video of the teacher reading a set text. The video had a recording of the teacher reading the text at approximately 95 words per minute (the targeted reading fluency speed for this group of children), and a copy of the text on screen with a curser following the words at the same speed as the audio reading of them. The children were instructed to read aloud along with the recording which took about 5 minutes to complete. The teacher had explained that the children were doing this independently using the digital technology in order that they could go at their own pace and that they could stop, rewind, replay and pause as they felt necessary. The teacher explained that group reading, or collective reading would not have allowed for this, and as such the teacher was using the technology in order to facilitate greater independence and personalised experiences for the children, as well as freeing up her own capacity. The teacher oversaw the four children undertaking this task and used their capacity to intervene. After the children had read the text they were asked to complete a set of questions about what they had read.

Observation 3

Observation 3 (T1, Obs. 3) was of a 30-minute writing lesson with four children from across year 6 who needed specific intervention. The teacher provided an input from the IWB with the children sat at rectangular tables forming a horse-shoe shape around it. The teacher moved around the classroom during this input perching on tables or standing to the side of the room. The children watched a short You Tube musical film extract on the IWB about friendship. They were then asked to read through some examples of poems about friendship before highlighting phrases on those paper copies that they particularly liked. Those phrases were then to be used in the next lesson when they wrote their own friendship poems. The teacher responded to children's needs in a variety of ways. For example, at one stage the teacher noticed that one child was struggling to hold a sheet of paper whilst writing on the write-on wall at the same time. The teacher intervened and picked up the sheet and held it up for him next to his writing; without saying a word, enabling him to continue focusing on the writing and thus making the task more achievable for him. Neither teacher nor child exchanged a word about this action but the pace and quality of the child's work was immediately impacted. Similarly, the teacher used language very precisely to encourage children who expressed doubts about their abilities. The children responded to the encouragement with an immediately more confident sounding response. Another feature was the way in which the teacher adapted to

unexpected events. For example, a colleague entered the room interrupting the teacher in order to ask a question. The teacher immediately adapted what they had been doing so that the children in the class were able to continue without the teacher for the short duration it took to resolve the issue.

Appendix P: Observation Vignettes for Case 2

Observation 1

The first observation was for 1 ¼ hours following morning playtime, of a Year 6 English writing intervention group of 10 children who were either working towards or not yet securely achieving age related expectations (T2, Obs. 1, 1.1). The observation took place in one of two intervention rooms; the Learning Hub. This room was about double the size of a standard classroom, set out in an L shape. It was used flexibly with easily moveable chairs, 3 clusters of tables, and a portable Interactive Whiteboard. The bright and attractive room had a number of windows with the blinds closed upon arrival (which were not changed throughout). The room housed a 3D printer, and three laptop trolleys (each of which housing either Chromebooks, Windows 10 laptops or Asus ZenPads).

Figure AQ1: Photograph 1/2 showing Teacher 2 classroom

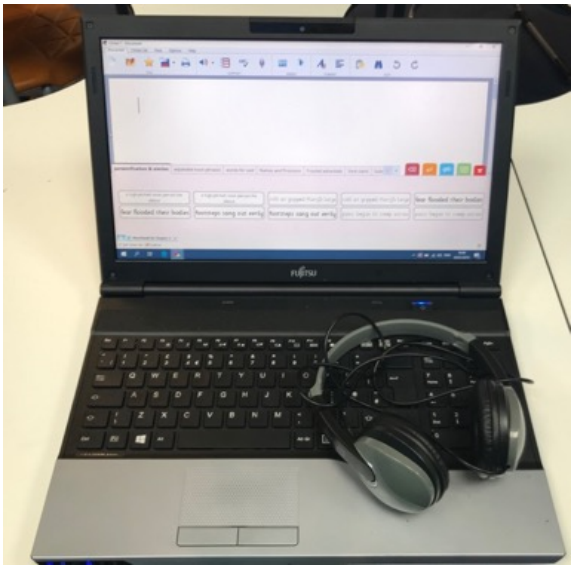
This image shows to the left of the researcher when standing at the corner of the 'L' shape room.

Figure AQ2: Photograph 2/2 showing Teacher 2 classroom

This image shows to the right of the researcher when standing at the corner of the 'L' shape room.

None of the children in this lesson had special educational needs (T2-2, 10.28). Prior to the lesson the teacher explained that this lesson was part of a sequence of lessons where children would be writing part of a chapter of a story based on Harry Potter. The project had begun with children visiting Harry Potter World as a stimulus and would end with children reading aloud their story in front of a green screen with Harry Potter scenery being added onto it, and those final films would be shown to parents as a 'black tie screening' at the end of the term. The teacher described the children as being very motivated and engaged by both the project and the process that their learning was going through. In lessons previous to the one being observed the children had made detailed plans for their stories, created wordbanks and written their first two chapters. This lesson was to focus on using their plans and wordbanks to write the first part of chapter 3 of their story (T2, Obs. 1, 1.6). Prior to the lesson the teacher set up 6 laptops and headphone sets with Clicker 7 (Crick Soft). Some children arrived early to the lesson and the teacher invited them to help set up the laptops and headphones which the children then did independently. The remaining children arrived into the classroom after their morning break and specific individuals were directed to sit on one of two tables (T2, Obs. 1, 1.7) based on their prior learning and needs. Table A had 5 laptops evenly spread around the table (in front of every-other chair), and the 4 girls and 1 boy on it were going to be working independently using Clicker 7 on their laptops to construct their writing. Table B had printed wordbanks, and the 4 boys and 1 girl were going to be working with the teacher modelling and supporting them, writing by hand in their books. (T2, Obs. 1, 1.8-11). Both tables had access to the same wordbank which consisted of vocabulary and phrases that had previously been co-constructed as a whole group in a previous lesson; Table A had this on Clicker 7 (see photo below), and Table B had a printed copy. Both tables also had access to a Topic Wordbank in their books.

Figure AQ3: A laptop, headphones and Clickr set up for children



The teacher immediately set off the independent group to start their writing using Clicker 7 (T2, Obs.1, 1.13). Two of the five children had faulty headphones, but the teacher had pre-empted this by putting out spare sets of headphones and a spare laptop, so the children simply exchanged them and continued to work (T2, Obs. 1, 1.14). The combination of features such as this ensured that the lesson did not have any time wasted and that children's focus was immediately on, and remained on, the learning underway.

Once all children had arrived the teacher introduced the researcher and then explained the lesson intention. The teacher then ensured that the children had all their resources to hand, using phrases such as 'what do we need…', inviting children to own the process of checking their resources, before recapping the previous lesson and explaining the intentions for the current lesson (T2, Obs. 1, 1.12). The teacher led group were then taken through a modelled example on the Write-on Wall (a floor to ceiling wall that acted as a wipeboard – seen in the photo below), with the vocabulary being drawn out of the children. The teacher used the portable interactive whiteboard with a wireless keyboard to show extracts of You Tube clips of Harry Potter film – pausing and asking children to describe the sensory experiences that characters may be having at those points in the film (e.g. sights, smells, sounds). These were then used to inform sentence construction and vocabulary choice (T2, Obs. 1, 1.15).

Teacher phrasing was consistently positive; 'Yes that's great', even when correcting misconceptions or suggesting improvements. Phrases included 'Let's vary that up a bit, let's try…', 'You could have a …. I think that would work well because…', 'Do you know what…', 'Just remember that…', 'Let's have a look at… for some inspiration'; all said with a smile and positive tone. Some more complex misconceptions were addressed by phrases such as 'The reason I'm not using [that word] is because it suggests…', and, when a child suggested an idea inappropriate for the current context 'Maybe… but let's save that one for later' (T2, Obs. 1. 1.16).

It was noticeable that the teacher gave plenty of encouragement and specific praise to children, using their name and detail of what they had done well. For example, they said 'I just want to share this amazing learning here… [child's name] has realised that he has all these resources here but he's also realised he has his whole [exercise] book full of ideas so he has gone back to get ideas of personification and used them to expand and magnify his writing'. This reference to the child 'realising their whole book was full of ideas' was a cleverly worded reminder to other children which maintained the child's dignity. The teacher's Enacted practice was full of examples such as this which recognised the importance of emotional and social aspects of learning. The teacher also said 'I'm just going to show off for [child's name] here.. she's written… [read work aloud] and used… [read their work aloud] ', and immediately this had an effect of motivating another child who asked if they too could read their work out to the class (T2, Obs.1, 1.17). Similarly,

the teacher also regularly used positive gesture – a reassuring hand on a child's back or standing behind and slightly to the side of a child so that they were alongside each other when looking at a piece of work (T2, Obs. 1, 1.19). The inference of body language as the teacher being a support rather than a dominance was noticeable and a contrast to many other teachers that this researcher has observed professionally. The teacher spoke in a quiet volume throughout and used a wide range of vocal pitch and body language, with some dramatisation when reading out sentences in order to give ideas to the children. The teacher either sat amongst the children that they were working with, or when presenting did so from amongst or behind the children – using a wireless mouse and keyboard to make that possible (T2, Obs. 1, 1.25).

When children were doing something incorrectly the teacher did not name them publicly in the same way that they had done with praise; instead the teacher spoke to them individually, or as a group, or occasionally as a whole class describing the misconceptions or errors as '*we* just need to change…', or 'when we use… the effect it creates is…', or 'you've already used [grammatical tool], is there another type you could use?'. This use of pronouns was a clever tool which inferred that the learning was considered to be a collective process, and again supported a view that the teacher was conscious of the social and emotional aspects of learning. Examples of this included a child who had written an overly simple sentence with the teacher saying 'That's a perfect opportunity for an expanded noun phrase, see if you can fit one in', and for a child who was going off at a tangent with their plot the teacher said 'Are you going to come off your story plan, or are you going to keep it simple and stay on the story plan?'. Notably, one child said, 'Can you help me?', her reply was 'How can *I* help *you*, or How can *you* help *yourself?* How could you work that out for yourself?' (T2, Obs. 1, 1.18).

The children were on task nearly exclusively throughout the lesson. A few minutes from the end of the lesson the teacher asked the children to read out loud their own work to themselves. During this review period the teacher used phrases such as '[child's name], you're reading that beautifully and I'm really enjoying listening to it but what you're not doing is… (T2, Obs. 1. 1.21). At the end of the lesson the teacher explained how the work would connect to later work and then thanked the children and asked them to say goodbye to the researcher as they left (T2, Obs. 1, 1.22).

Observation 2

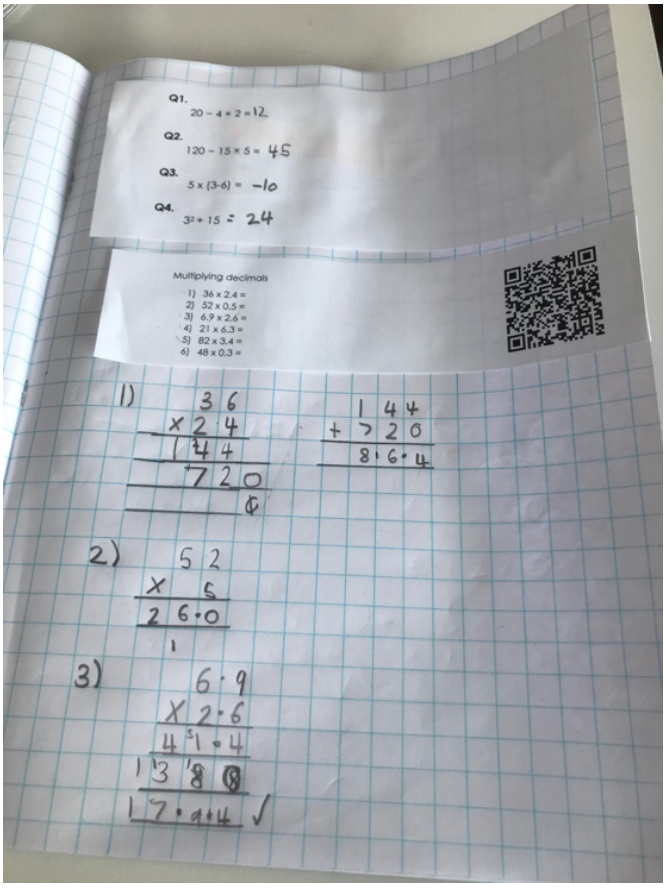
The second observation was of a maths intervention group of five children from Year 6. It took place from 2-2:20pm; mid-way through an English writing lesson in their usual classroom (T2, Obs. 2, 2.1). The room where the observation took place is known as the intervention room which was used for a range of intervention groups for all abilities and academic subjects. The room had a trolley of laptops at the back of the room and a

portable interactive whiteboard at the front of the room (T2, Obs. 2, 2.22). The children entered the room at the allocated time and quickly and quietly chose where they were going to sit. The furniture had been set out in rows by the previous users of the room and as the intervention group was for a short period of time this was not changed by the teacher or children.

The children brought with them Chromebooks that they had been using in their usual classroom, and one child also brought a box containing maths exercise books (T2, Obs. 2, 2.4). The teacher asked the children if they had brought their own headphones and a number of children replied that they were broken, so the teacher said they would use the Chromebooks without headphones as there was only 5 children, and would review if it became too noisy (T2, Obs. 2, 2.5). The teacher introduced the researcher and explained the researcher's presence as 'watching what we do' and that 'we can show off our maths learning' (T2, Obs. 2, 2.6). The teacher explained that the children's usual class teacher had analysed their recent (KS2 national assessments practice) test paper and identified areas which each child had found tricky. The teacher had a list with this information on and read out to the class which areas that child should focus on in this intervention session. These areas included formal multiplication, subtracting fractions, multiplying decimals, BODMAS and percentages. Once this list had been read out the teacher reminded the children that they could have a look at the list at the front of the class if they forgot what they should be focusing on (T2, Obs. 2, 2.7). The teacher explained that each child should choose one or more of the areas they found tricky and take a 'paper slip' from the front with 5-6 questions on it relating to that skill. This explanation and provision gave the children a combination of direction whilst also allowing them choice in their priorities, who they worked with, and task management which aligned with a social constructivist view.

Each paper slip (seen in Photo below) also had on it a QR code which the children were to scan using their Chromebooks, and which would take them to a YouTube video of one of their teachers demonstrating how to do this particular skill area.

Figure AQ4: Child's book with QR code



The videos were hosted on one of a number of YouTube channels and had been created by a number of different teachers at the school (including Teacher 1 and Teacher 2). Some were videos of a teacher in front of their interactive whiteboard as if they are teaching a class. Some are a teacher voiceover whilst demonstrating on an exercise book or with equipment. The children commented that they used this approach (QR code linked videos to support written work) a lot and that they liked it (T2, Obs. 2, 2.8). The use of this approach enabled children to work at a pace which matched their understanding and freed the teacher's capacity to be able to provide targeted intervention and support which was about addressing misconceptions (utilising their pedagogical content knowledge) rather than repeating demonstrations (imparting subject knowledge).

The children were asked to stick the slips of paper into their books and then record their workings and answers underneath. The children were familiar with this and their books showed that this way of working was regularly used (T2, Obs. 2, 2.9). A child asked if she could do something not on the list as she was finding that area difficulty. The teacher said 'yes of course' (T2, Obs, 2, 2.10). This dynamic between the teacher and child whereby the child recognised their own learning needs and felt that they could ask to deviate from the brief, along with the teacher's positive response suggested a learning environment where both teacher and children had a sense of agency within their work. Another example of this was where four children grouped together informally to see if they could

use the SeeSaw app on their ChromeBooks as a QR reader. They tested this idea and they discovered that they could not. The teacher suggested they went to Google search and searched for the term QR code scanner, which they did, and they then used this to scan their QR codes (T2, Obs. 2, 2.11). There was clearly an established dynamic whereby the children felt agentive and able to explore alternative means of achieving the lesson intentions. When children finished one slip of paper, they were using the Chromebooks calculator to check their answers which again freed teacher capacity to provide targeted support. Children then moved independently on to the next task, maximising the use and impact of the time available (T2, Obs. 2, 2.18).

The teacher initially sat with one child and invited another child to join their conversation (about BODMAS) if they felt that it would be useful. The teacher said “let’s remind ourselves what we know about BODMAS… what do we know and what do we do first.. (referring to the slip of paper with the questions on). The child talked aloud to each other about their understanding and how they would go about the task (T2, Obs. 2, 2.12-13). This kind of discussion dynamic highlighted the social and negotiable way that the teacher was encouraging learning to take place through. The key features were where the children engaged in learning dialogue with each other and the teacher intervened with expert contributions where necessary, but also observed – absorbing an understanding of what the children were doing as part of their own learning about the classroom dynamics. It was not the content that reflected mutuality, but the social interactions. Two girls chose to sit together to work collaboratively on a BODMAS question – they watched the video, tried part of the task, and then re-watched the video or sections of it multiple times, and discussed between them the most effective way to address the questions on their slip of paper (T2, Obs. 2, 2.16). The teacher sat between two girls at the front of the class. The teacher spoke to them about how they went about solving a question, saying; ‘I use…’ and then ‘so if you get stuck that’s a good method to use…’, and then ‘I personally wouldn’t [use that strategy] and the reason I wouldn’t is because…’, and then ‘I see what you are doing, you are muddling… so well spotted… so what is…’ (T2, Obs. 2, 2.19). The teacher later worked with one girl and said “Can I show you a little trick here… the method you have used is great for questions 1, 2, 3 and 4 but not so much for questions 5 and 6, so why is that?”, and then after the child had explained their thinking she said ‘so think carefully about the strategy that you use for each question’ (T2, Obs. 2, 2.20). The nature of the language used by the teacher was again important as it demonstrated a supportive approach and engaged the children in dialogue with the teacher; a highly empathetic dynamic. The teacher encouraged a girl not to use the calculator (on the Chromebook) for a sum saying, “You’ll feel so much prouder if you do it yourself” (T2, Obs, 2. 2.22). One of the children asked the teacher “is this right?’ (referring to a question and answer). The teacher said, “So tell me what you’d do”, and the child explained their process, and so the

teacher responded “so why don’t you try it and see if you can get an answer that you think is realistic?” (T2, Obs. 2, 2.23).

The researcher spoke to the children and one boy commented that he found the QR linked videos more helpful than a teacher explaining to him because he could see what was going on at the same time as listening to the instructions. A girl explained that she could watch and re-wind these videos as many times as she needed so that she understood what was being said. Another girl said that she found the mixture of the pencil/paper and Chromebook/QR code/Video more helpful to aid her learning than just using technology or not using it at all (T2, Obs. 2, 2.17).

The teacher then said to the class that if they had a question that hadn’t been completed on their slips then they should complete that before they next worked together (T2, Obs. 2, 2.23). The children grumbled about having to leave the lesson which they verbalised that they had been enjoying, and that they found it far more enjoyable than the writing lesson that they had to go back to (T2, Obs. 2, 2.25). As children packed up their belongings and left, the teacher thanked them for working with her and goodbye to them. They then returned to their classes (T2, Obs. 2, 2.28).

Appendix Q: Observation Vignettes for Case 3

Observation 1

Observation 1 was of a 15-minute activity whereby Year 5 children were revising a specific French wordbank introduced in the previous lesson. An image was shown on the Interactive Whiteboard (IWB) and children were asked to raise their hand if they could name it using the correct vocabulary. The teacher then chose one of the children who had raised their hands who subsequently walked to the front of the class, pressed an 'answer button' on the IWB which reflected their response and then returned to their seat and the cycle repeated (T3, Obs. 1, 1.1-1.9). Incorrect answers were corrected by the teacher (T3, Obs. 1, 1.10,1.11), and at the end of the activity children were dismissed with the teacher standing at the door as they filed out.

There were a small number of children in each lesson who were on the school SEN register; one with dyspraxia and two others with minor behaviour difficulties. These children were not observed to respond or behave differently to the rest of their peers during the lessons. The classroom walls had displays around the room sharing subject specific vocabulary and with shelves containing resources - none of these appeared to be referenced or used in any of the observations undertaken.

Observation 2

Observation 2 was of a 45-minute French lesson which was part of a sequence of activities. Year 6 children had been asked to write a draft about a place that they had lived at or knew well as part of their prep (homework). This was then going to be written up in best in their exercise books during the lesson with improvements made during the writing up process (T3, Obs. 2, 1.1-1.2). At the start of the lesson the teacher invited children to volunteer to read to the class an example draft displayed on the IWB, and the teacher then made some suggested comments about how the grammar might be improved. The children were then asked to respond to some true or false statements about what they had just read or heard; a question was displayed on the IWB, children raised their hands and the teacher then chose one to share their answer and then to go to the front of the class and press an image on the IWB. The child then returned to their seat and the next question took place. The teacher then asked children to volunteer to read out their prep drafts and gave verbal feedback to each before the children wrote up their drafts in their exercise books. During the writing up of these drafts 1 child initially, and then a further 5 children, asked if they could get out a Google Chromebook so that they could look up the place they were writing about on Google StreetView in order to remind themselves of key features which they were describing (T3, Obs. 2, 1.15, 17). The teacher appeared reluctant but agreed for children to use the Chromebooks which the children independently fetched from a laptop cabinet, returning to their desk to login and access

Google Maps and StreetView (T3, Obs. 2, 1.18). The children appeared familiar and confident using the Chromebooks and spoke to the researcher about their familiarity using them in other lessons (T3, Obs. 2, 1.19, 1.20). Children completed the written task, with the teacher moving around the classroom to attend to individual requests for help (T3, Obs. 2, 1.22). Children did not appear to ask peers for help or use other resources to help them and so some children waited with their hand up between 5-10 minutes before being given assistance (T3, Obs. 2, 1.22).

The teacher used language such as 'If you…,' 'Yes and…,' 'and then…', 'is that….', 'let's have a look…', 'what did you…', 'what we need to do here is…', 'let's stick to the basics…', 'so just use…', 'you'll need to change…', 'that says…', 'we need to put…'. It was notable that in the lesson only one phrase was heard by the researcher where the teacher expressed to a child that their work was incorrect 'no – that's wrong, it should be…'(T3, Obs. 2, 1.23). At the end of that lesson the teacher asked the children if they needed more time to complete their work and then instructed them to put their things away and proceed to their next classroom.

With only two exceptions, when the teacher gave feedback to children about their work during the independent activity period, they noticeably used the pronoun 'we' rather than 'you'. This was noticeable because it appeared to contrast with the earlier espoused behaviourist views where the teacher is seen as the authority (RQ1), and instead suggested at least at surface level a more co-constructive approach. However, this pronoun use was an isolated example within Enacted practice, and so has been treated as a learned discourse tool rather than representative of pedagogical values and beliefs.

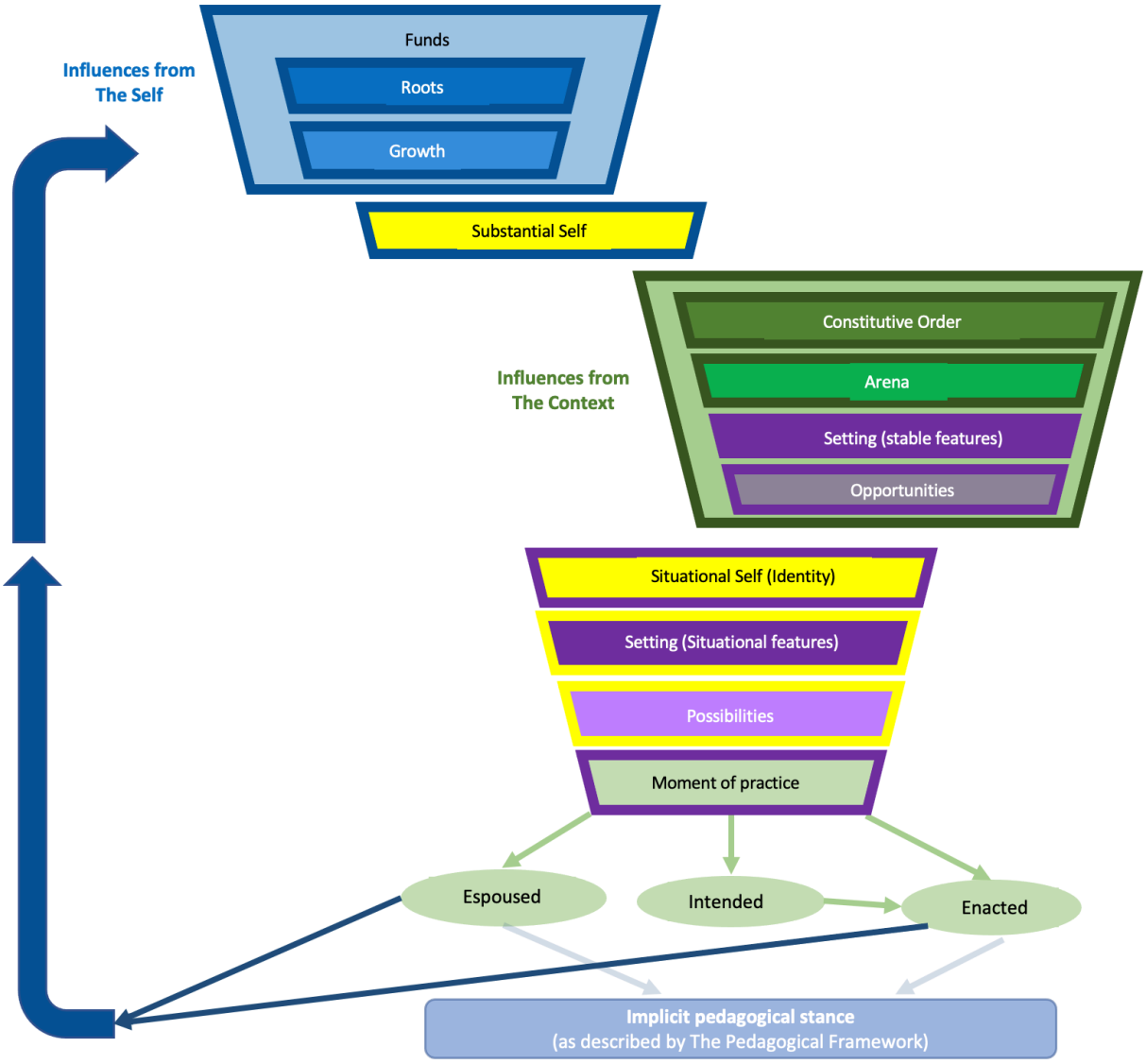
Observation 3

Observation 3 was of a 45-minute French lesson where Year 5 children were shown images on the IWB and then asked to respond to those images using a prepared wordbank of vocabulary that had been learned in the previous lesson. The teacher asked named children to respond to the images in turn and responded with positive encouragement phrases such as 'very good', 'very impressed with' or 'excellent' (T3, Obs. 3, 1.5). The teacher then said they would like to 'raise a little point about pronunciation' to the wider class; addressing a common mistake that had been made (T3, Obs. 3, 1.6). The children were then asked to carry out the same task but with written instead of oral responses, with the teacher modelling one handwritten example on a large wipeboard displayed adjacent to the IWB (with the IWB being used to project resources) and the children given worksheets with the images and prompts for their writing (T3, Obs. 3, 1.9). Children largely began the task before the teacher had finished the explanation (T3, Obs. 3, 1.11). The teacher asked children to stop and to listen, and similarly for the children to raise their hands rather than call out, but when those behaviours resumed, they were not

then later addressed (T3, Obs.3, 1.12). Children completed their worksheets, mostly quietly, independently and on-task (T3, Obs. 3, 1.13). About half of the class completed a task on the worksheet, as per previous teacher instruction, that the teacher realised was not relevant to the lesson and asked anyone who had not done this to leave it out (T3, Obs. 3, 1.13). One child rose from their desk during the lesson with the teacher asking where they were going before immediately instructing them to sit down before they had a chance to reply. The child conformed (T3, Obs. 3, 1.13). The correct answers to each point were given at the end of the lesson with the teacher saying that 'you've all done enough for me' (T3, Obs. 3, 1.14). The teacher then talked through the correct answers and instructed children to tick their own work if it was correct (ibid). At the end of the lesson the teacher introduced the children's prep task by projecting a Microsoft Word document through the IWB which displayed the date, title and layout instructions for these Year 5 children. The teacher explained the task as drawing named animals, colouring them in and then writing their opinion of the animals next to it, thus using the vocabulary learned in the lesson (T3, Obs.3, 1.15). The teacher then typed, using two fingers, onto the Word document project onto the IWB what the children needed to write in their homework diaries (T3, Obs. 3, 1.15), which children then copied. The teacher and children then tidied up their resources and the teacher said goodbye to each child as they then left the room (T3, Obs. 3, 1.17).

Appendix R: Definitions for the Funnels of Influence Model

AS1: The Revised Funnels of Influence Model



A summary of each conceptualisation within the Funnels of Influence model – defined by the literature and as revised through the findings - can be summarised as;

- Funnel of Influences from the **Context** at the Moment of Practice
    - **Constitutive Order:** Taken from the work of Lave (1988) and Twining, Browne, *et al.*, (2017), this constitutes the Cultural, Political, Global and National Systems and Permeating Beliefs: What overarching influences are shaping the landscape that this Moment of Practice sits within? (e.g. government and politics, media, law, economics, industry, national cultural beliefs about the nature of childhood/children family, work, education, social interaction, global disruption of digital technology etc.).
    - **Arena:** Drawing on the work of Lave (1988) and Twining, Browne, et al., (2017), this constitutes the enduring (longer term) features of the human and physical space of the many Arena that the teacher moves between (school,

home, clubs, shops etc). In this study attention is on the school Arena that the teacher's practice – at the Moment of practice - takes place within. Specifically, the enduring features within it (e.g. facilities, routines, expectations).

    - **Setting (stable features):** An adjusted interpretation of ideas originally set out by Lave (1988) and Twining, Browne, et al., (2017), the Stable features of a Setting are the specific combination of human and physical features within which practice takes place (e.g. a classroom) and which are not routinely changed. These consist of the children and adults present, the location, available resources etc. The changeable features of a Setting are treated separately (see below).
    - **Opportunities (within the Setting):** Taken from the work of Twining, Browne, et al., (2017), What are the options available for the teacher to engage with – which could include people (e.g. an available Teaching Assistant), resources (e.g. a trolley of laptops), timetabled capacity (e.g. a one-hour lesson) etc.
- Funnel of Influences from within the **Self** at the Moment of Practice
    - **Roots:** Drawing on the work of Abercrombie (1993) and Nias (1993), the Substantial Self as meaning-maker (unique to the teacher and created through formative years). What shaped the lens of the teacher's formative years? What influenced their sense of self and mission? (e.g. social ideologies, norms, values and belief systems, culture and sub-culture, and culturally informed elements of self – age, gender, health etc).
    - **Growth:** Drawing on the work of Esteban-Guitart and Moll (2014), and Polman (2010), the Funds of Identity from previous experiences. What experiences and influences shaped the teacher's transition from child to this Moment of Practice? (e.g. the impact of sequences of experiences within and across personal and cultural influences as well as national policy, rules, facilities, social representations of learning, ICT, significant actors and scripts etc).
- Influences where the two funnels collide
    - **Identity** (Situational Self): Drawing on the work of Beijaard, Verloop and Vermunt, (1999), Korthagen (2004), Olsen (2008), Beauchamp and Thomas (2009), Pillen, Den Brok and Beijaard (2013), Who does the teacher consider that they are in this moment? What meaning do they conceive that they are making? Why the teacher thinks they are doing/saying the things that they do (the consequent choices made as a result of all the above).
    - **Setting (Situational features):** Drawing on the work of Twining, Browne, *et al.*, (2017), Consisting of Actors – people; their presence and the multifaceted influence of their presence, and Scripts – non-human factors such as practical resources and digital technology access.

- **Possibilities:** Drawing on the work of Twining, Browne, et al., (2017), Which of the available options does the teacher *perceive* as possible to them personally? This could include how a TA might be deployed or available resources (e.g. a trolley of laptops). This will also include perceived expectations (what the teacher thinks is expected of them by the different actors), and what they perceive they can therefore do (Agency).
- As seen through;
    - **Espoused** practice: What the teacher says
    - **Intended** practice: What the teacher intends to do
    - **Enacted** practice: What the teacher lives out

Each of Espoused, Intended and Enacted practices are effectively treated as a symptom or symbol of output from the Funnels of Influence above them and is bounded within a specific moment. For example, not all espoused practice will be consistent; each moment being shaped by different combinations of aforementioned influences.

As a result of this model pivoting around ‘The Moment of Practice’, as soon as that moment passes, the symbols of practice (Espousal, Intention, Enactment) becomes re-conceived as part of Growth – seen through the upward arrows. This concept works both within practice (e.g. Reflection in Action) as well as consequent to practice (e.g. Reflection on Action), and also will not necessarily be consciously processed.